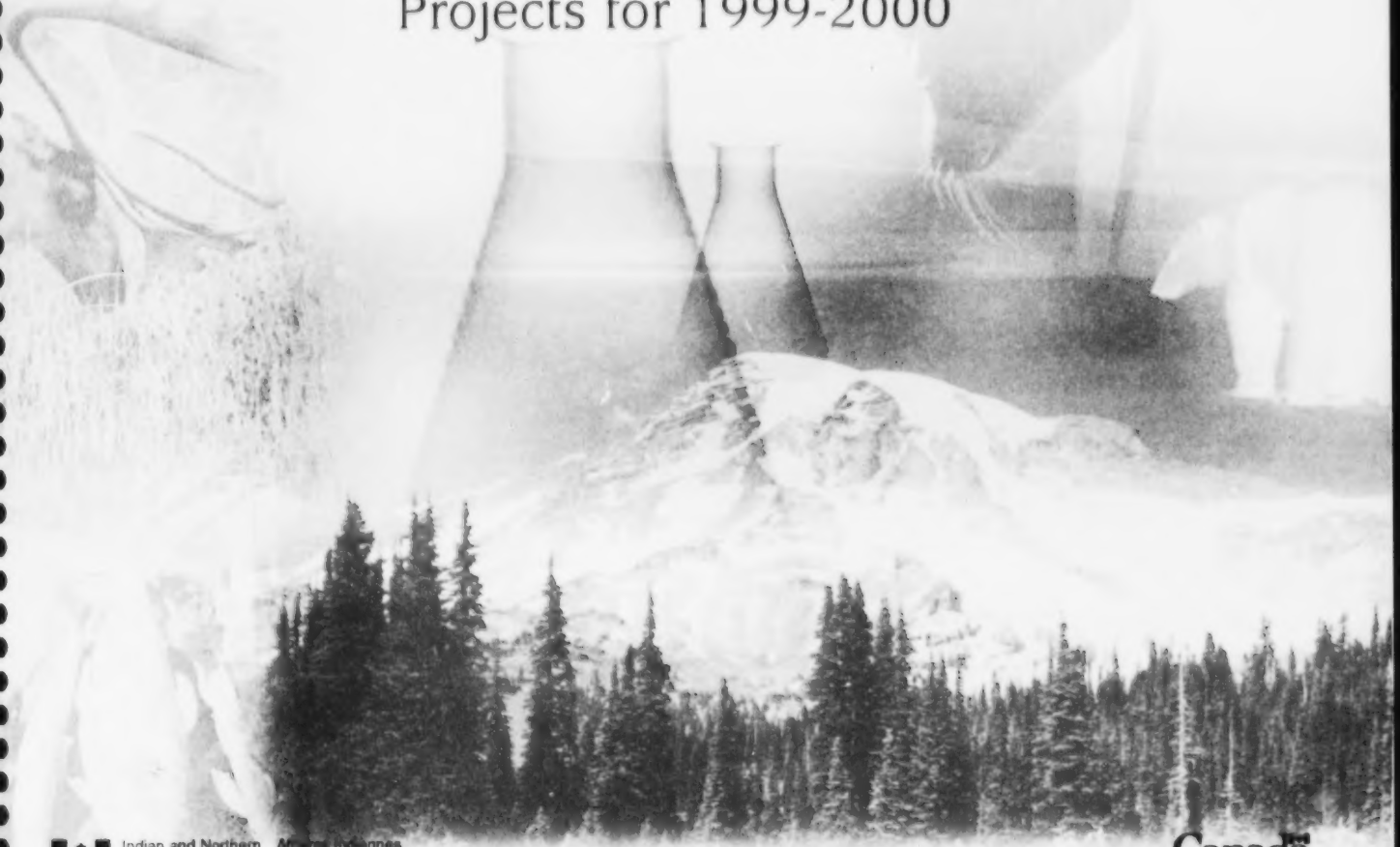
Summary of

Northern Contaminants Program

Projects for 1999-2000



Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

Canada

106-00530/

Summary of
Northern Contaminants Program
Projects for 1999-2000

Acknowledgements

We would like to thank all project team members for the time they took to provide project summaries. Thanks also to Russel Shearer, Janine Murray and Sarah Kalhok who took the time to review, edit and supply comments and recommendations regarding the booklet.

Authors: John McEwen and Christopher Lemieux

French and Inuktitut version available.
(Inuktitut translation by Leonie Kunnuk)

Forward

The Northern Contaminants Program (NCP) began in 1991 in response to studies which showed the presence of contaminants in the Arctic ecosystem. Many of these contaminants had no Arctic sources. The three main contaminant groups of concern are heavy metals, radionuclides and persistent organic pollutants. Some of these contaminants are found at unexpectedly high levels in animals at the top of the food chain and in humans. The NCP brings together federal departments (DIAND, HC, EC and DFO), the three territorial government departments, Aboriginal organizations (Council of Yukon First Nations, Dene Nation, Inuit Tapirisat of Canada, Inuit Circumpolar Conference and Métis Nation) and university researchers to work towards eliminating contaminants in traditionally-harvested foods and to provide information that assists informed decision-making by individuals and communities in their food use.

The NCP – Phase II is a five year program (1998 – 2003) which funds research on northern contaminants issues at $5.4 million per year, in addition to supporting the Centre for Indigenous Peoples' Nutrition and Environment (CINE) and the participation of Aboriginal organizations. A portion of the funds are directed to communicating the research results to communities; this part of the program is lead by the representatives of the five northern Aboriginal Organizations that are partners in the program. Between 1991-1997, NCP research was focussed on assessing where and at what levels contaminants were found in the arctic, and confirming the source region. Now, the emphasis of the NCP is shifting towards providing advice to communities and reducing contaminants at the source. There is a greater emphasis on human health research, developing effective community dialogue, increasing community participation, and working towards international agreements to control the release of contaminants.

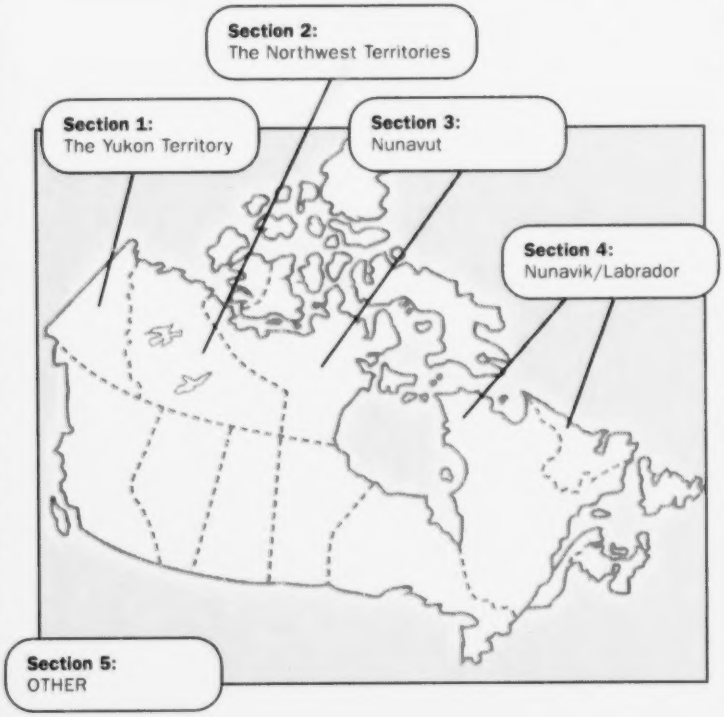
Each year, people seeking funding for projects related to northern contaminants issues, submit proposals to the NCP. A committee of scientists and representatives of the five northern Aboriginal organizations meet to evaluate the proposals and approve funding for projects which meet the goals of the program. Anyone conducting research in the North is required to consult with the communities that will be involved in the research. Project leaders are required to present their results at an annual NCP conference, and to submit a brief description of their research results at the end of the year. Every year since 1991 these results have been published as the "Synopsis of Research Conducted under the Northern Contaminants Program". These documents are available by contacting the NCP.

This booklet, the "Summary of Northern Contaminants Program Projects for 1999 – 2000" provides a quick, non-scientific reference guide for communities on current-year projects being conducted by the NCP.

How to Use this Booklet

To help you find the information in this booklet that is of interest to you:

- The booklet is divided into five sections based on the geographical location of where projects are or will be mainly occurring (The Yukon Territory, The Northwest Territories, Nunavut, Nunavik/Labrador and Other).



- Each project summary contains the question the project is answering, relevance (why the project is occurring), summary and location.
- There are "icons" (please see below and the following page) located throughout the pages of the booklet to help communicate what the project is about, how you can get more information about the project, and where and when the project is occurring.
- The bolded words within the text of the booklet are defined in the Glossary of Terms in Appendix 1, at the end of the booklet.
- If you wish to search for a project by key subject areas and contaminant, affiliation or project leader, please refer to Appendix 2 (Affiliations and Project Leaders) and Appendix 3 (Key Subject Areas and Contaminants), at the end of the booklet.
- If you have more questions about any of these projects, contaminants in the north or contaminants in general, there is a list of people whom you can contact for this information in the More Information section in Appendix 4, at the end of the booklet.

EXPLANATION OF ICONS USED IN THIS BOOKLET

Description of what information the ICON is trying to communicate:

Project Category

Monitoring/International project

International Policy project

Human Health project

Communications project

What the project is studying

Organochlorines (OCs) contaminants

Heavy metal contaminants

Radionuclide contaminants

Traditional food

Seals

Polar Bears

Sea Birds

Ducks

Mussels

Whales

Fish

Caribou

Terrestrial Mammals

Marine Mammals

People

Plants

Snow

Rain

Walrus

Soil

Air

Water

Sediment

Other Details:

The project involves work taking place in a laboratory

The project involves computer models and database work

The project involves a workshop and/or a meeting

Contact Information

The time frame of the project

The schedule of the project

The location of the project

Wherever there is a project that deals with one of these descriptions, it is marked with the icons shown above.

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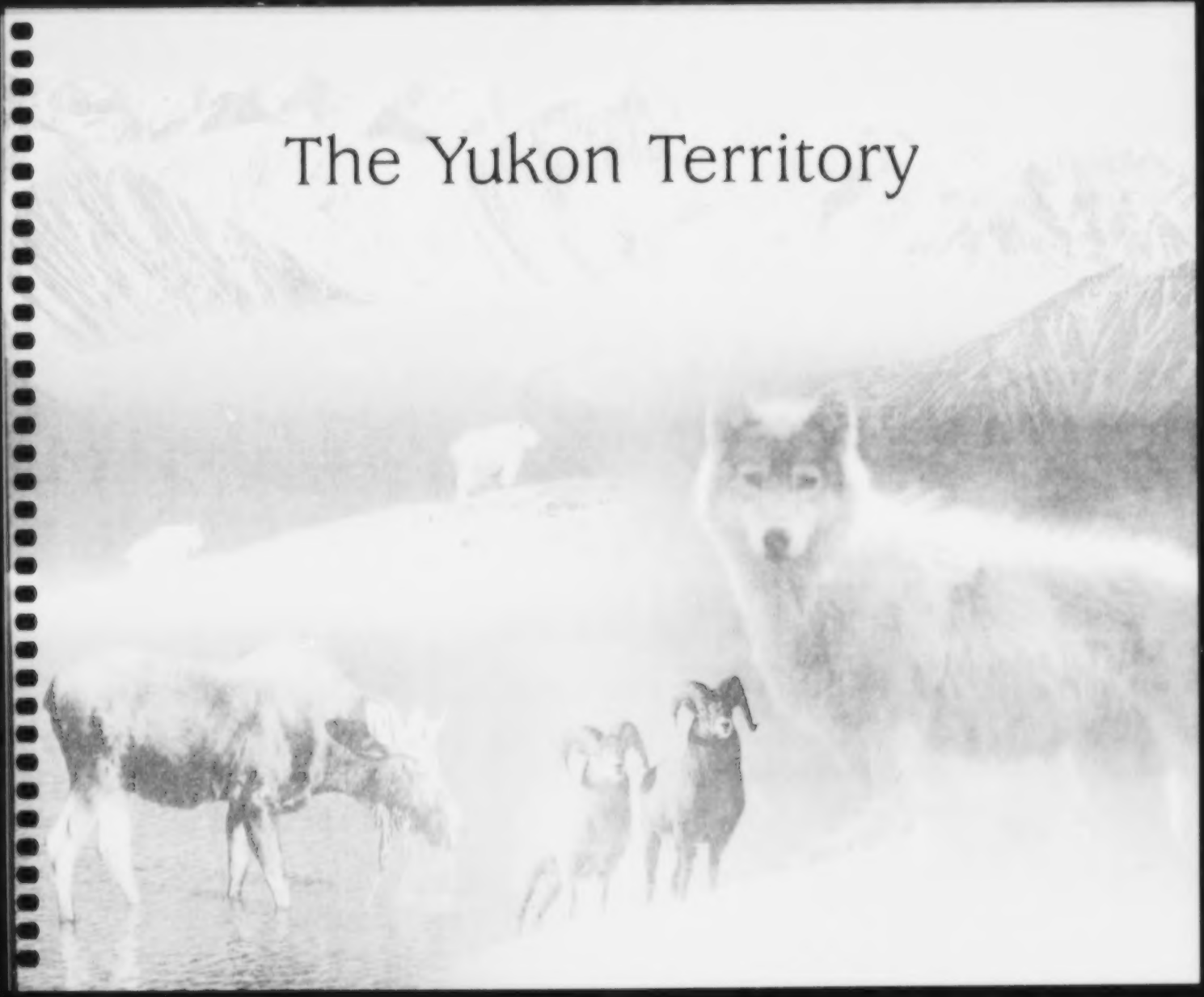
The Yukon Territory



Building on the CINE Dietary Study Report

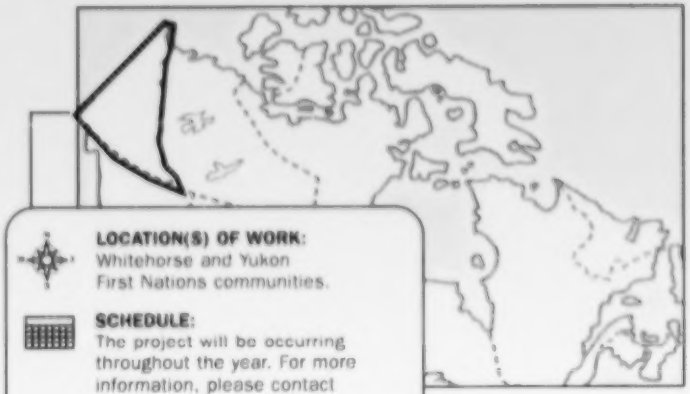
Q What are the benefits and potential risks of consuming various traditional foods?

RELEVANCE:

Extensive research under the **Northern Contaminants Program (NCP)** has been funded to understand the effects of environmental **contaminants** in the North, and the implications for First Nations and others. An important aspect of this research effort has been the focus on the traditional foods consumed by First Nations to better understand the benefits and potential risks of consuming various species. In 1995, the Council of Yukon First Nations (CYFN) requested that a dietary study be done to get a better understanding of the kinds of traditional and store bought foods people were eating, and what contaminants and nutrients were in those foods. The communication of the results of this study and building on them in partnership with communities is an important part of this effort.

PROJECT SUMMARY:

The Council for Yukon First Nations (CYFN) will communicate the key results from the dietary study. These include nutritional aspects, risks of not eating traditional foods, contaminants aspects, the differences between short and long-term exposure, and socioeconomic benefits of traditional foods. The results will be presented at a community/First Nations workshop. Youth, women and elders are considered to be the key audience with which to emphasize the benefits of traditional foods. Community health and nutrition representatives, scientists, local experts in traditional knowledge, youth and elders will collaborate in the development of presentation materials. Educational resources developed for communicating these results including posters, nutritional fact sheets and audiotapes will be available for future use.



LOCATION(S) OF WORK:
Whitehorse and Yukon First Nations communities.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Cindy Dickson
Council of Yukon First Nations
11 Nisutlin Drive
Whitehorse, YT
Y1A 3S4

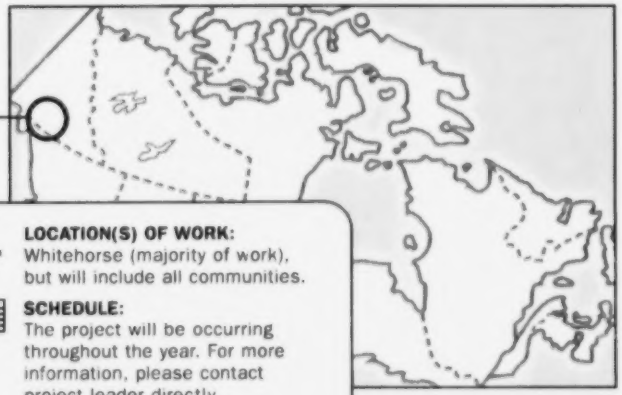
Phone: (867) 667-7631
Fax: (867) 668-6577
E-Mail: ncp.cyfn@yukon.net

TIME FRAME:
April 1999 – March 2000. Educational resources including posters, nutritional fact sheets and audio tapes, will be developed for results communication.

RELATED PROJECTS:
Related projects include "Assessment of Dietary Benefit: Risk in Inuit Communities (Phase III)", page 14 in booklet and "Urban Whitehorse Aboriginal Women: Education on Traditional Food", page 5 in booklet.

Traditional Knowledge Research Guidelines (Phase II)

Q How can traditional knowledge (TK) be used to monitor the health of people and their environment?



LOCATION(S) OF WORK:
Whitehorse (majority of work), but will include all communities.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

RELEVANCE:
There is growing recognition that TK contributes to program planning and has the ability to validate western scientific approaches on research, planning and policy development. The use of TK along with western science in monitoring the health of people and the ecosystem has become increasingly important. TK provides information on the uses of plants, natural medicines, and on wildlife and plant harvesting methods. A TK research guideline will enhance the relationship between western scientists, various stakeholders and Yukon First Nations, and ensure proper protocols are followed when scientists research indigenous people, their knowledge and their lands.

PROJECT SUMMARY:
A draft TK research guideline will be prepared. This guideline will include: guidance on protocols for collection, use, access and storage of TK, tips for interviewing TK holders, ownership rights and confidentiality, methods for language translation, and how scientists and First Nations' TK holders and communities can develop a positive and rewarding relationship.

The researcher will continue to document past, present, and proposed research on TK, and will begin to look at possible locations for storing Yukon TK. A Working Group, established in Phase I, will organize community discussions to solicit concerns and suggestions using materials accumulated through earlier meetings. Elders will provide advice on how to proceed.

A Yukon wide workshop will be co-ordinated to introduce the guideline and provide a forum for discussion by the public and Yukon First Nations.

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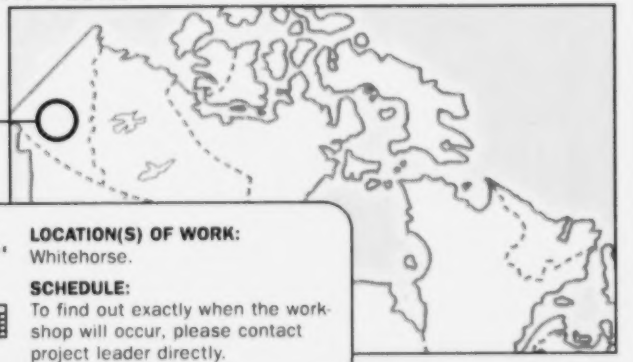
E-Mail: ncp.cyfn@yukon.net

TIME FRAME:
April 1998 – March 2000. Final TK guideline is to be completed by March 2000.

Urban Whitehorse Aboriginal Women: Education on Traditional Food Benefits and Contaminant Risks



Q How can we promote informed decision-making among urban Whitehorse Aboriginal Women concerning their food and health?

RELEVANCE:
Whitehorse Aboriginal women have not been approached with regard to receiving or sharing information on **contaminants** in traditional food, and on the benefits of consuming traditional food. In particular, young urban women need this information to make informed decisions as they raise their families and develop food and diet patterns. These women often do not have close links with their communities and elders, where this type of information is usually transmitted. They may not have had access to the dietary communication initiatives under the **Northern Contaminants Program (NCP)** from which their communities have benefited. It is important to promote informed decision-making about health issues and traditional food use among urban Aboriginal women beyond the First Nation level.

PROJECT SUMMARY:
This project will communicate the results of the "Assessment of Dietary Benefit: Risk in Inuit Communities" to urban Aboriginal women, particularly those women who are over 40 years of age, and those who live in Whitehorse. Women from other communities who do not always have the means or opportunity to attend workshops on health and diet issues will also be approached. Project team members will present a balanced picture of contaminant risks, and nutritional and sociocultural benefits of using traditional food, and discuss how to balance the use and budgeting of traditional foods with market foods. Presentations and discussions will be outdoors where participants can camp out and experience cultural/traditional living.

LOCATION(S) OF WORK:
Whitehorse.

SCHEDULE:
To find out exactly when the workshop will occur, please contact project leader directly.

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TIME FRAME:
April 1999-March 2000.

RELATED PROJECTS:
Related projects include "Assessment of Dietary Benefit: Risk in Inuit Communities (Phase III)", page 14 in booklet and "Building on the CINE Dietary Study Report", page 2 in booklet.

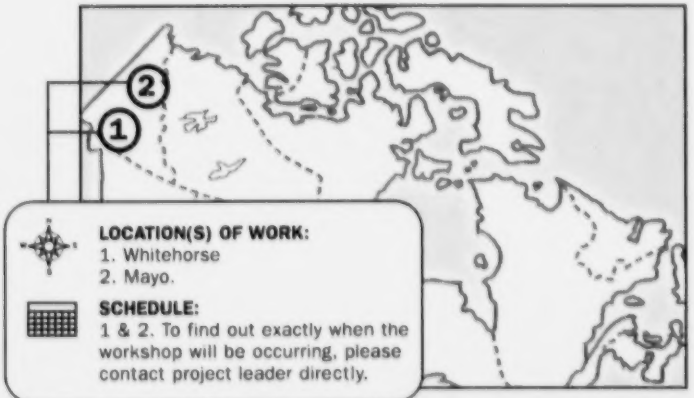
Contaminants Awareness Project

Q How can communities be better informed on contaminant issues?

RELEVANCE:
This project deals with establishing a community-based approach to deal with global and local concerns regarding contaminants in the environment. Communities need to become better informed about contaminants issues and need to develop capacities to become actively involved with contaminants work. A community-based approach is required to address these concerns regarding contaminants, and to identify ways that western science and traditional knowledge can be combined in contaminants work.

PROJECT SUMMARY:
This project will help build capacity at the community level to better understand the basics of environmental contaminants, and allow youth and elders the opportunity to establish a working relationship and a common approach to contaminant issues. It will also allow communities to be informed on issues and concerns related to the global effects that contaminants have on the environment and be able to identify potential issues in the community.

Project team members will organize community contaminants awareness workshops to communicate contaminants information to community and traditional territory residents. Issues and concerns will be documented and compiled for future use.



LOCATION(S) OF WORK:
1. Whitehorse
2. Mayo.

SCHEDULE:
1 & 2. To find out exactly when the workshop will be occurring, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Cindy Dickson
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Whitehorse, YT
Y1A 3S4

Phone: (867) 667-7631
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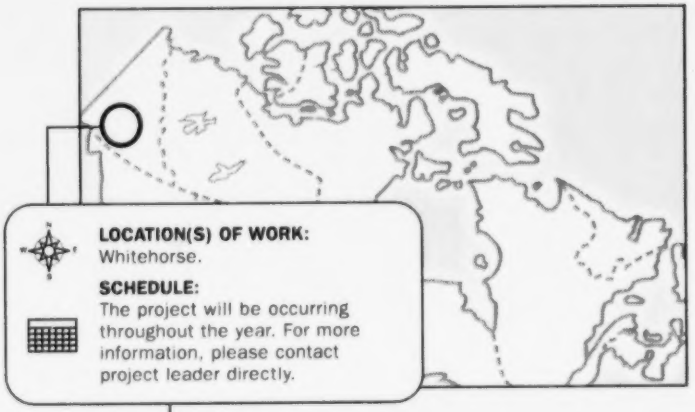
TIME FRAME:
April 1999 – March 2000. A detailed report on the workshop proceedings will be drafted, complete with video and audio tapes of the workshop. A training report will also be developed.

Yukon Cancer Registry – Communications Package

Q What can the Yukon Contaminants Committee (YCC) tell us about **cancer** in the Yukon?

RELEVANCE:
Over the past ten years, northerners have been bombarded with information on **contaminants** in traditional foods and people. Most contaminants being studied are considered or suspected to be **carcinogens**. This has resulted in communities being concerned whether cancer rates are increasing, and what the relationship is between these rates and contaminants. Communities are questioning what information is available on cancer in the north and what it can tell them.

PROJECT SUMMARY:
The YCC has been working with territorial health officials on designing a Yukon cancer registry and a related communications package. The Northwest Territories (NWT) have also developed a similar approach. This project will review the NWT Communications package and determine if the information is transferable to the Yukon, and develop a communications package and action plan (if further work is required).



LOCATION(S) OF WORK:
Whitehorse.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Mark Palmer
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TIME FRAME:
April 1999 – March 2000. A communication package and action plan for distribution to Yukoners will be produced upon completion of the project.

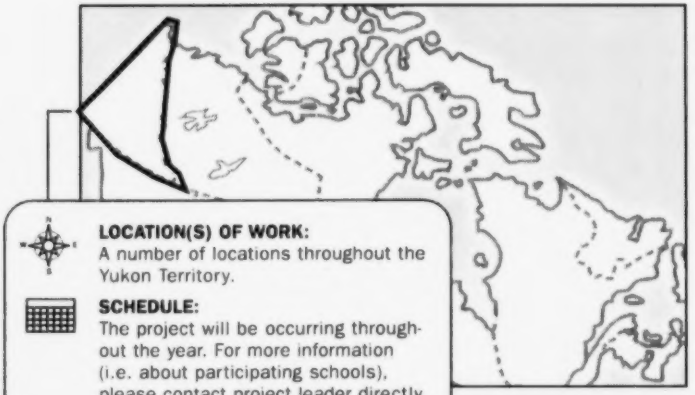
Contaminants in Northern Canada: Yukon Perspectives

Q How can Yukon youth be better educated about **contaminant** issues?

RELEVANCE:
Young people receive science and environmental education through the schools. Contaminants information can effectively be taught by integrating it into existing curricula. By doing so, youth will be able to share the knowledge at home, and prepare to be the leaders of the future.

PROJECT SUMMARY:
This project will build on the Contaminants in Northern Canada (1995) science curriculum developed by the Métis Nation (NWT) by giving the curriculum a Yukon perspective. A Yukon perspective means developing topics specific to the Yukon and to Yukon First Nations, matching the curriculum to Yukon's Department of Education mandated curriculm, involving Yukon teachers and students in developing curriculum activities for Yukon classrooms, and including the perspective of Yukon traditional knowledge.

During this third phase, project team members will be visiting classrooms across the Yukon and participating in events such as school camps. Community participation will be emphasized to make students, teachers and elders active in the curriculum development process. Posters and videos of various themes concerning contaminants in the Yukon will also be developed. A draft curriculum will be circulated among participating and interested teachers, Yukon Contaminants Committee (YCC) members and other interested groups for final edit. The project will target grades 2 to 8 inclusive.



LOCATION(S) OF WORK:
A number of locations throughout the Yukon Territory.

SCHEDULE:
The project will be occurring throughout the year. For more information (i.e. about participating schools), please contact project leader directly.

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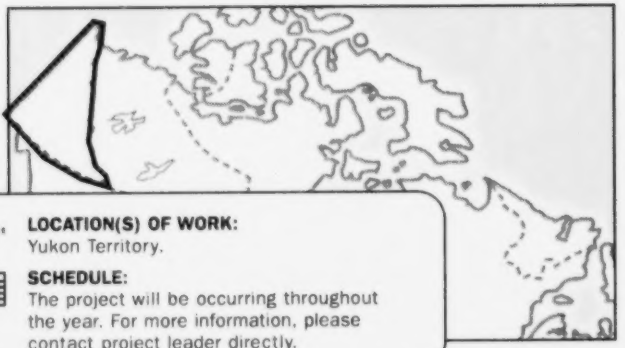
TIME FRAME:
April 1997–March 2000. Final curriculum package, poster series, video and any other developed materials will be completed by March 31, 2000.

RELATED PROJECTS:
Related projects include "Contaminant Education Program for Northwest Territories (NWT) and Nunavut Schools", page 20 in booklet.

Yukon Contaminants Committee Communications Program

Q How can communities in the Yukon find out more about **contaminants** research and have opportunities to get involved in the **Northern Contaminants Program (NCP)**?



LOCATION(S) OF WORK:
Yukon Territory.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

RELEVANCE:
The NCP, now in its ninth year of research, has evolved to include Yukon communities in research and communications efforts. This has increased the need to have a Yukon Contaminants Committee (YCC), to co-ordinate contaminants information and research initiatives. The YCC was established in 1992 to address contaminants concerns within the Yukon. The YCC acts as a link between the scientific community and northerners on local, national and international issues. The core membership is diverse and consists of representatives from several federal and territorial departments, the Council for Yukon First Nations, Yukon Conservation Society and Yukon College. Several individual First Nations have also played a key role on the Committee.

PROJECT SUMMARY:
The YCC will continue to co-ordinate contaminants projects in the Yukon including the communication of results from all research projects as well as from other national and international initiatives. The YCC will review all project proposals in the Yukon for socio-cultural content as well as all Yukon based communications initiatives.

Committee members will continue to make themselves available to the public and will attend community meetings and workshops as required. The YCC chair sits on the national NCP Management Committee.

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TIME FRAME:
April 1999 – March 2000.

RELATED PROJECTS:
Related projects include "NWT Environmental Contaminants Committee", page 26 in booklet and "Interim Nunavut Environmental Contaminants Committee", page 46 in booklet.

Yukon Traditional Foods Monitoring Program

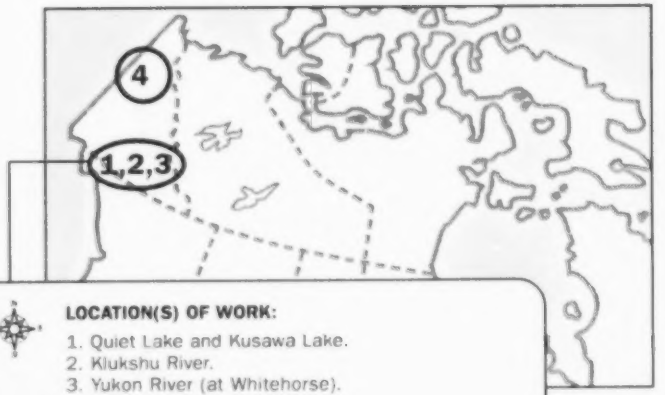
Q Are the levels of **contaminants** in Yukon wildlife changing over time?

What is being done to address specific Yukon community contaminants concerns?

RELEVANCE:
Public health advisories were issued in the Yukon as a result of high levels of some contaminants from tissues of Yukon fish and wildlife. However, the majority of Yukon traditional foods have been found to be very low in contaminants. This study is part of a continuing program to monitor the levels and trends of contaminants in Yukon traditional foods, compare results to those from earlier years, and address concerns raised by people in the Yukon regarding the safety of their foods.

PROJECT SUMMARY:
Burbot liver and lake trout flesh samples will be collected from Quiet and Kusawa lakes this year. Quiet and Kusawa lakes have been selected because historical data and **archived** samples exist for the selected fish, lake water chemistry is known, the lakes can support sample collection, both lakes support subsistence fisheries, and neither lake has local sources of contamination. Salmon tissue samples will also be collected from the following rivers: Klukshu (sockeye), Yukon at Whitehorse (king), and Porcupine at Old Crow (chum). All salmon sampling locations support subsistence fisheries.

All fish samples will be analyzed for a number of **persistent organic pollutants (POPs)**. A portion of each sample collected will be archived for future reference. No samples of caribou or moose will be collected this year. However, a detailed proposal for sampling terrestrial **mammals** will be submitted next year.



LOCATION(S) OF WORK:

1. Quiet Lake and Kusawa Lake.
2. Klukshu River.
3. Yukon River (at Whitehorse).
4. Porcupine River (at Old Crow).

SCHEDULE:

1. The burbot and lake trout samples will be collected in the spring (March/April) and the fall (September/October), respectively.

2–4. The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Mark Palmer
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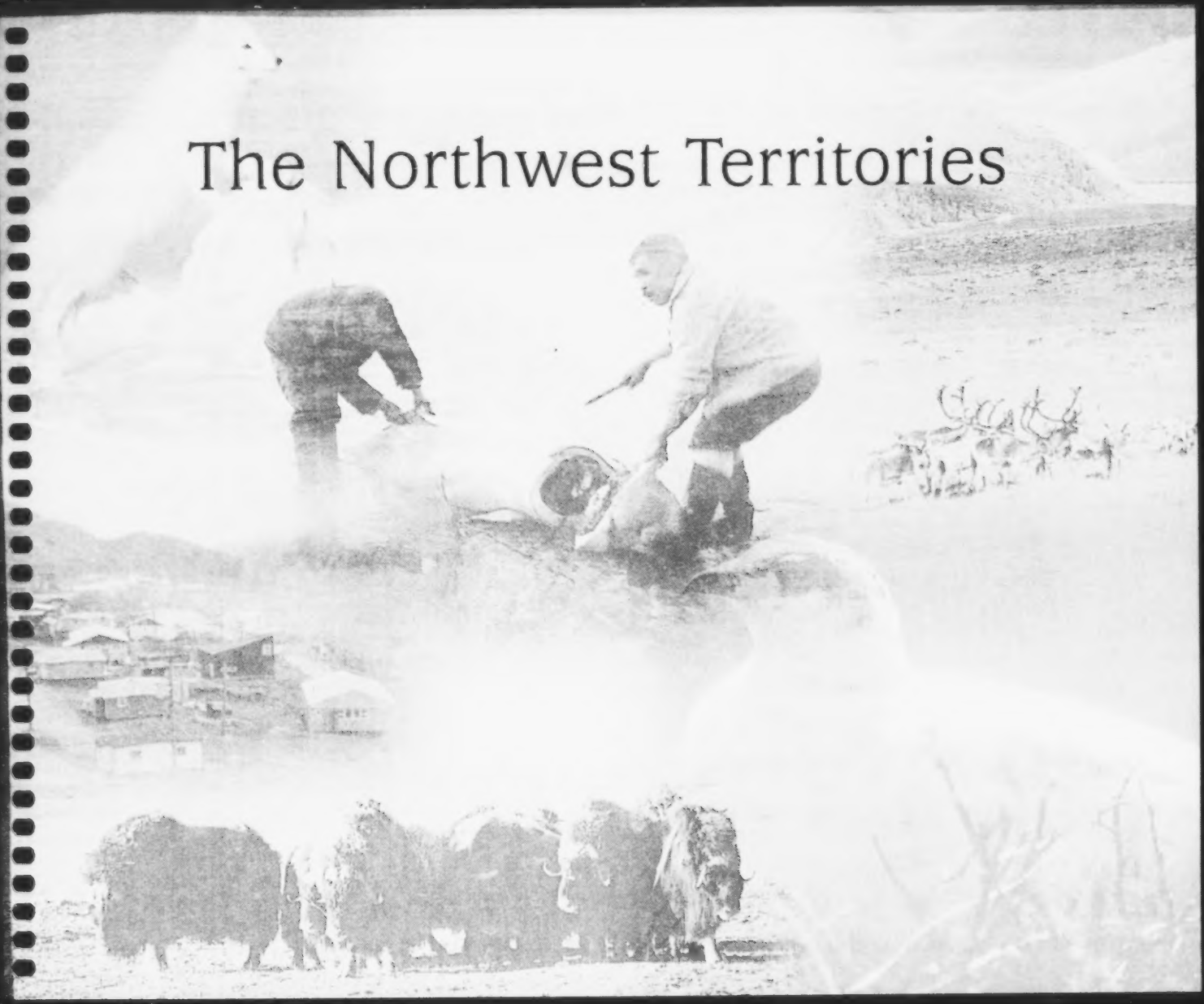
E-Mail: palmerm@inac.gc.ca

TIME FRAME:

April 1997–March 2003. Results summaries will be provided to appropriate communities upon completion of the project. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

The Northwest Territories



Assessment of Dietary Benefit: Risk in Inuit Communities (Phase III)

Q How much and what types of foods (including traditional foods) are eaten by Inuit?

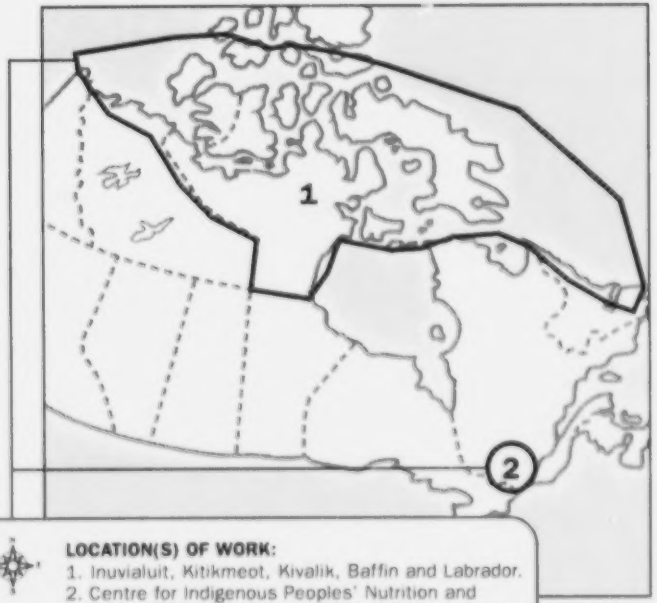
What are the benefits of consuming traditional foods?

What amounts of **contaminants** may people be exposed to through their diet?

RELEVANCE:
A diet based on traditional foods has important nutritional benefits and also contributes to northern peoples' overall well being. This study will measure the important contribution of traditional food relative to people's overall nutrition. Information about the levels of contaminants found in traditional food will also be assessed to allow scientists to estimate people's exposure to contaminants and the amount of risk associated with different foods. This will improve the knowledge about the benefits and risks associated with the diets of people in Inuit regions so that informed decisions about food consumption can be made.

PROJECT SUMMARY:
Overall, this project will gather information about traditional and market food consumption among Inuit in five regions (Inuvialuit, Kitikmeot, Kivalik, Baffin and Labrador) among 18 communities and complete databases of nutrient and contaminant contents of traditional food. It will document benefits of traditional food, and determine levels of dietary exposure to contaminants.

In this phase, survey data and food samples will be analyzed for nutrient and contaminant levels. A draft report will be produced by February 2000 and discussed in a workshop with delegates from all regions. This workshop will provide directions to produce the final report and proceed with the dissemination of research results to all Inuit communities.



LOCATION(S) OF WORK:
1. Inuvialuit, Kitikmeot, Kivalik, Baffin and Labrador.
2. Centre for Indigenous Peoples' Nutrition and Environment (CINE) laboratory, McGill University, Montréal, Québec.

SCHEDULE:
Data analyses will take place at the CINE laboratory in Montreal and the location of the workshop to review results is to be decided. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: H.V. Kuhnlein
Centre for Indigenous Peoples' Nutrition and Environment (CINE)
McGill University
21, 111 Lakshore Rd.
Ste. Anne de Bellevue, PQ
H9X 3V9

Phone: (514) 398-7544
Fax: (514) 398-1020
E-Mail: kuhnlein@agradm.lan.mcgill.ca

TIME FRAME:
April 1997–March 2000. Discussion of results with communities will begin in January 2000. Preliminary results will be presented at the **Northern Contaminants Program (NCP)** Annual Results Workshop. Final reports and publications will be available in 2000.

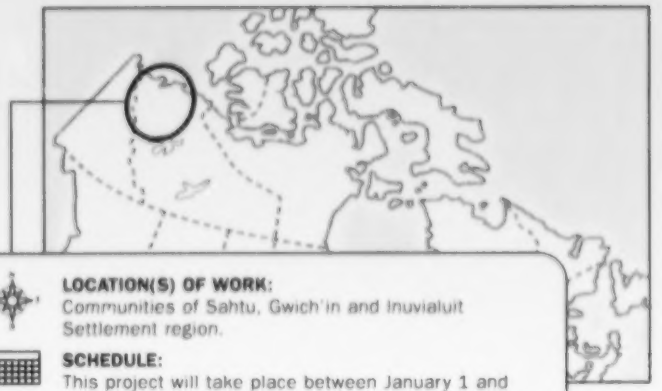
RELATED PROJECTS:
Related projects include "Inuvik Regional Human Contaminants Monitoring Program", page 16 in booklet,"Building on the CINE Dietary Study Report", page 2 in booklet.

Inuvik Regional Human Contaminants Monitoring Program

Q How much are people who live in the Inuvik region exposed to organochlorines (OCs) and heavy metals?

RELEVANCE:
People can be exposed to **contaminants** through the traditional foods they eat. We need to have a better understanding of the relationship between what people eat and the contaminants levels in their bodies in order to estimate the risks that these contaminants might pose on human health. This study will provide baseline information on the current contaminants levels in peoples in the Inuvik region, and will improve our ability to assess risk and enable us to monitor changes in contaminant levels over time.

PROJECT SUMMARY:
The sampling of hair for **methylmercury** analysis and of maternal and umbilical cord blood for certain OCs and metals will continue under the Inuvik Regional Human Contaminants Monitoring Program. Women from the Inuvik Regional Health and Social Services Board district, who intend to deliver their babies at the Inuvik Regional Hospital or the Stanton Regional Hospital before June 30, 1999, will be invited to take part. In this study, blood and hair samples will be collected and a twenty minute questionnaire will be given during the last 3 months of pregnancy. The amount of contaminant exposure through the diet of traditional food will be estimated from this information.



LOCATION(S) OF WORK:
Communities of Sahtu, Gwich'in and Inuvialuit Settlement region.

SCHEDULE:
This project will take place between January 1 and June 30, 1999. For more information on this project, please contact the Inuvik Regional Health and Social Services Board at (867) 777-2955.

CONTACT INFORMATION:
Project Leaders: Chuck MacNeil
Inuvik Regional Health and Social Services Board
Bag Service #2
Inuvik, NT, X0E 0T0

Phone: (867) 777-2955
Fax: (867) 777-3436
E-Mail: pcsmd@invik.net

Karen Tofflemire
Programs Coordinator
Inuvik Regional Health and Social Services Board
Bag Service #2
Inuvik, NT, X0E 0T0

Phone: (867) 777-2955 ext. 177
Fax: (867) 777-2482
E-Mail: Karen_Tofflemire@gov.nt.ca

TIME FRAME:
June 1997–March 2000. After June 1999, personal results will be made available in the participants medical health records for their viewing if desired. A final results report will be printed for distribution to the participants and other interested agencies.

RELATED PROJECTS:
Related projects include "Assessment of Dietary Benefit: Risk in Inuit Communities (Phase III)", page 14 in booklet.

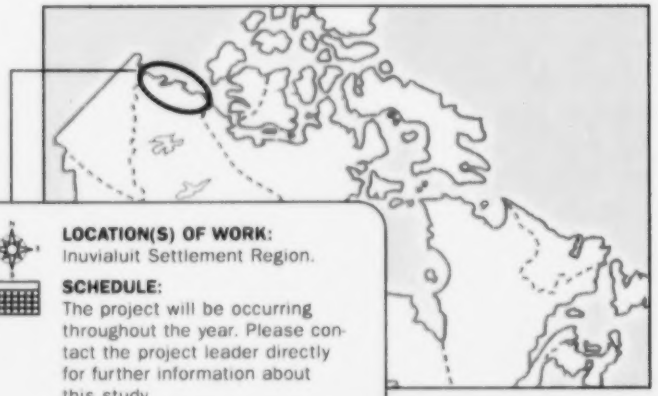
Edible Weights for Harvested Species in the Inuvialuit Settlement Region

Q What are the average edible weights of each species of **mammal**, bird, or fish harvested for traditional food in the Inuvialuit Settlement Region?

RELEVANCE:
A key indicator of potential exposure to **contaminants** from traditional food is the total edible weight of traditional food harvested. However, the mean edible weight of each species is for the most part not known. Therefore, a standardized set of edible weights for each species of mammal, bird, or fish harvested for traditional food, combined with ongoing harvest survey data, would provide a continuing basis for reliable monitoring potential human contaminant exposure by species, tissue, and location.

PROJECT SUMMARY:
The average edible weight of each species of mammal, bird, or fish harvested for traditional food in the Inuvialuit Settlement Region will be determined. This information, combined with ongoing harvest survey data, will show the total weight of traditional food harvested, and how much is harvested at any particular location. This information will help estimate the maximum potential exposure to contaminants in traditional food, at a community level, based on species, tissue, and geographic location of the harvest. It will also help to quantify the benefits provided by traditional food.

There is no field research as existing samples will be analyzed. The results of this project will help in conducting human risk assessments, and in monitoring trends in contaminant exposure.



LOCATION(S) OF WORK:
Inuvialuit Settlement Region.

SCHEDULE:
The project will be occurring throughout the year. Please contact the project leader directly for further information about this study.

CONTACT INFORMATION:
Project Leader: Peter J. Usher
Wildlife Management Advisory Council (NWT)
Box 2120
Inuvik, N.W.T.
X0E 0T0

Phone: (867) 777-2828
Fax: (867) 777-2610
E-Mail: pjusher@istar.ca

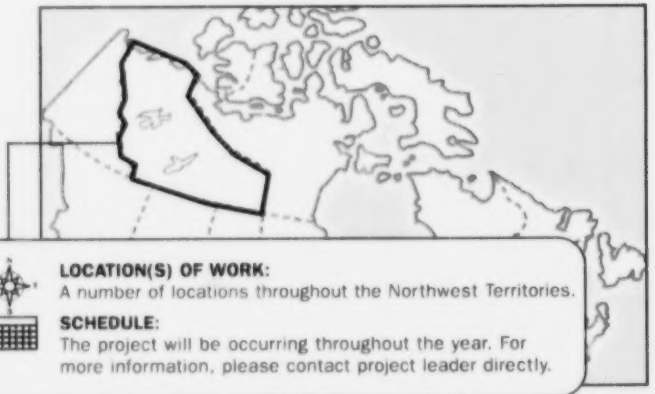
TIME FRAME:
April 1999 – March 2000. A report consisting of information on standard edible weight estimates will be released and distributed as a public document by the Joint Secretariat – Inuvialuit Renewable Resource Committees.

Training and Support for Regional Contaminant Coordinators (RCCs)

Q What can be done to more effectively communicate **contaminant** information to communities?

RELEVANCE:
The **Northern Contaminants Program (NCP)** has attempted to assist decision making through a number of capacity building exercises at regional and community levels. An example has been the creation of Regional Contaminants Coordinators (RCCs). RCCs are a crucial link in the communication between communities and the NCP. The RCCs have been given a lot of responsibility and therefore require appropriate training.

PROJECT SUMMARY:
This project will help guide and support RCCs to carry out their duties as community resource people. RCCs will attend a 2-day training session that will provide an overview of the scope and findings of the NCP. At this session, the RCCs will be given materials for community presentations, and information and skills to develop their own presentation materials as necessary. The RCCs will also have input into the development of a standard NCP information package that will be used as reference material for communities and field visits. RCCs will identify contaminant issues of concern for their region.



LOCATION(S) OF WORK:
A number of locations throughout the Northwest Territories.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Judy Farrow
Director
Environment Division,
Métis Nation – NWT
P.O. Box 1375
Yellowknife, NT, X1A 2P1

Phone: (867) 873-3505
Fax: (867) 873-3395
E-Mail: metisnwt@internorth.com

TIME FRAME:
April 1999-March 2000. A project report will be made available to interested parties upon completion of the project.

RELATED PROJECTS:
Related projects include "Frontline Training Course for Northern Community Professionals", page 38 in booklet, "Regional Contaminants Co-ordinator (RCC): Gwich'in Tribal Council", page 24 in booklet, and "A Five-Year Inuit Strategy of Communication and Action on Contaminants in the Arctic Environment", page 40 in booklet.

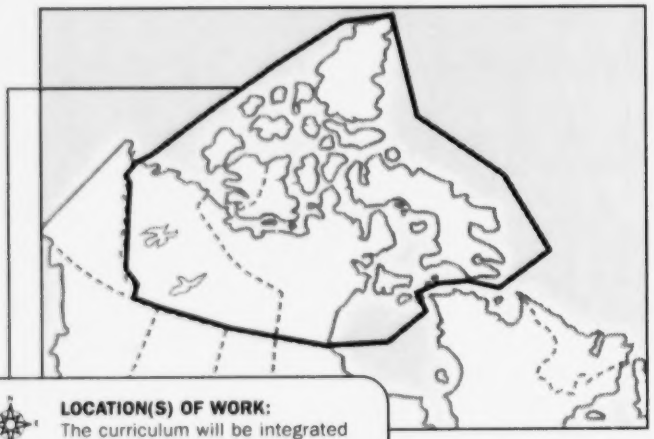
Contaminant Education Program for Northwest Territories (NWT) and Nunavut Schools

Q How can northern young people learn more about **contaminants** issues?

RELEVANCE:
Young people receive science and environmental education through the schools. Contaminants information can effectively be taught by integrating it into existing curricula. By doing so, youth will be able to share the knowledge at home, and prepare to be the leaders in the future. This project produces a contaminant education program that is designed to integrate the existing curricula for Northwest Territories (NWT) and Nunavut schools.

PROJECT SUMMARY:
The main body of work for this project will be to write lesson plans for the Junior High socials studies curricula and the High School Northern Studies Curriculum. The lesson plans for the social studies curricula will focus on the international negotiation process to stop the uses of selected contaminants. They will examine the issues for Northerners affected by contaminants in their **food chains**, as well as the issues for the contaminant users, particularly those in developing countries. The political process that leads to negotiated controls on the use of contaminants and the role of Aboriginal Organizations will also be examined.

In the Northern Studies Curriculum, contaminant issues will be studied from a circumpolar aspect and include the work of the Arctic Monitoring and Assessment Programme (AMAP) as well as the **Northern Contaminants Program (NCP)**. This is a required course for all NWT students. All students will have an opportunity to study these issues from a Northern perspective.



LOCATION(S) OF WORK:
The curriculum will be integrated in schools throughout NWT and Nunavut.

SCHEDULE:
The project will be occurring throughout the year. To find out exactly when and where the project will be occurring, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Judy Farrow
Director
Environment Division,
Métis Nation – NWT
P.O. Box 1375
Yellowknife, NT, X1A 2P1

Phone: (867) 873-3505
Fax: (867) 873-3395
E-Mail: metisnwt@internorth.com

TIME FRAME:
April 1997–March 2002. Pilot testing (practice testing) results from lesson plans for the Junior High social studies curricula and the High School Northern Studies Curriculum will be made available upon completion of the project.

RELATED PROJECT(S):
Related project(s) include "Contaminants in Northern Canada: Yukon Perspectives", page 8 in booklet.

Annual Traditional Knowledge Workshop

Q How can scientists and Dene elders better integrate traditional knowledge (TK) and western science?

RELEVANCE:

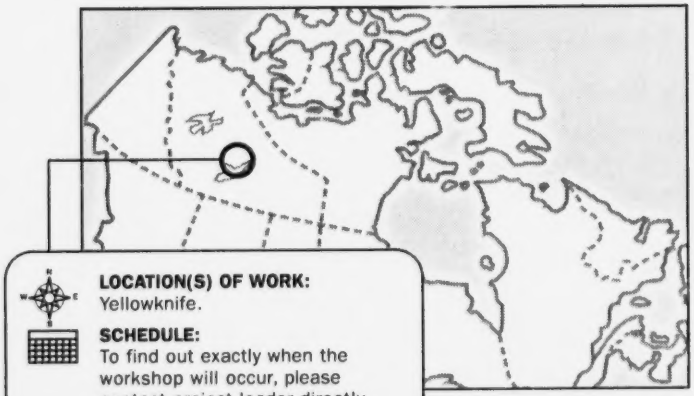
Contaminants research in the North has produced a great deal of information. However, it is important that this information is communicated to communities in a culturally sensitive manner. Experience has shown that the best research occurs when all lines of communication are open and all parties understand and respect one another. With this in mind, it is important that Dene and western scientists discuss ways to better understand one another. The result will be research that is relevant to communities, understandable, more accurate and, in the long run, more economical.

PROJECT SUMMARY:

This project will enhance the existing Denendeh Environment Communications Strategy (DECS) to promote a better community dialogue between Denendeh communities and scientific and non-scientific researchers, and government and non-government agencies.

The Dene Nation will host the Fourth Annual Traditional Knowledge Workshop in Denendeh, to follow up on the 1996/1997 and 1997/1998 "Strengthening the Ties in Denendeh" Videos and the three Elders/Scientist Retreats, held February 1997, September 1997, and September 1998. This workshop is for Dene elders and youth, scientists, and community resource people.

Dene project members will plan the workshop with the Denendeh Environment Committee and scientists from different disciplines. Under this initiative, a plan for better integrating traditional knowledge (TK) and western science for future research projects will be developed.



LOCATION(S) OF WORK:
Yellowknife.

SCHEDULE:
To find out exactly when the workshop will occur, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Allison Armstrong
Lands and Environment Manager
Dene Nation
P.O. Box 2338
Yellowknife, NT
X1A 2P7

Phone: (867) 873-4081
Fax: (867) 920-2254
E-Mail: dene-nation@ssimicro.com

TIME FRAME:
April 1999 – March 2000. Planning for the workshop will be taking place throughout most of the year and a summary and final report (including video) will be available upon completion of the workshop.

Regional Contaminants Co-ordinator (RCC): Gwich'in Tribal Council

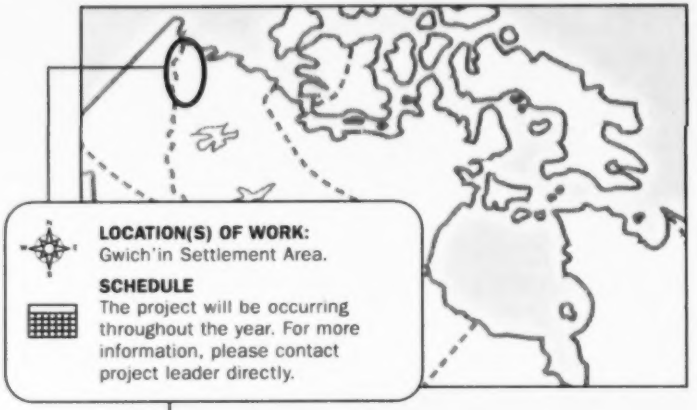
Q How can we better communicate information to Gwich'in communities on contaminants research?

RELEVANCE:
The Gwich'in, who rely heavily on traditional foods, have many concerns regarding contaminants in the **food chain** and the environment. Some of these concerns are the presence of **persistent organic pollutants (POPs)** in caribou, fish and other wildlife used for food.

An objective of the **Northern Contaminants Program (NCP)** is to reduce or, wherever possible, eliminate contaminants in traditionally harvested foods while providing information that assists informed decision making by individuals and communities in their food use. A Regional Contaminants Co-ordinator (RCC) would assist in providing information about risks, and means to reduce risks and exposures, and would contribute to the strategies to control and reduce contaminants in the Gwich'in Settlement Area. An RCC would increase opportunities for the Gwich'in communities to become involved in the contaminants issue and making informed decisions.

PROJECT SUMMARY:
The RCC will promote the communication of timely, accessible and accurate information on contaminants to a broad spectrum of community members in the Gwich'in Settlement Area. The information will be delivered in plain language presentations and workshops. The RCC will assist communities to identify and prioritize contaminants issues, act as the co-facilitator to communicate community concerns and priorities to appropriate authorities (i.e. the NCP) and respond to local information requirements on contaminants related to traditional foods and the health and safety of the environment.

The RCC will develop regionally relevant resource materials in full consultation with partners. These materials would include educational tools such as posters and videos. The RCC will assist researchers with community consultations, assist in negotiation of research agreements for funded projects and provide assistance by reporting project results to communities.



LOCATION(S) OF WORK:
Gwich'in Settlement Area.

SCHEDULE
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Richard Nerysoo
Gwich'in Tribal Council
Box 1509, Inuvik, NT XOE OTO

Phone: (867) 777-4869
Fax: (867) 777-4538
E-Mail: rnerysoo@inuvik.net

TIME FRAME:
April 1999 – March 2000.

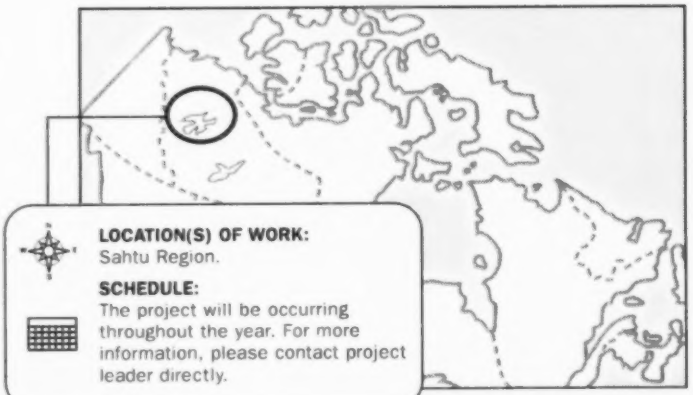
RELATED PROJECTS:
Related projects include "Training and Support for Regional Contaminant Coordinators (RCCs)", page 19 in booklet and "A Five-Year Inuit Strategy of Communication and Action on Contaminants in the Arctic Environment", page 40 in booklet.

Sahtu Contaminants Program

Q What is being done in Sahtu communities to provide **contaminants** information and involve them in **Northern Contaminants Program (NCP)** research?

RELEVANCE:
It is important to have someone who can provide capacity at the local level to inform people on the latest information on contaminants. This should be done primarily through oral means, and particularly, in the Slavey language. This will help communities to play an increased role in identifying problems, determining priorities, and getting involved in contaminant research projects.

PROJECT SUMMARY:
This project will continue to work with Sahtu communities in identifying contaminant concerns and priorities, in communicating the results of a moose and caribou sampling program and other monitoring programs, and in involving regional bodies like the Sahtu Renewable Resources Board in contaminants issues. As well, assistance will be provided to Sahtu communities in developing new projects, as appropriate.



LOCATION(S) OF WORK:
Sahtu Region.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Brian Davidson
Sahtu Secretariat
Box 144
Deline, NT
X0E 0G0

Phone: (867) 589-4719
Fax: (867) 589-4908

TIME FRAME:
May 1998–March 2000. Midyear and final project reports will be made available and presented to the Northern Contaminants Program (NCP).

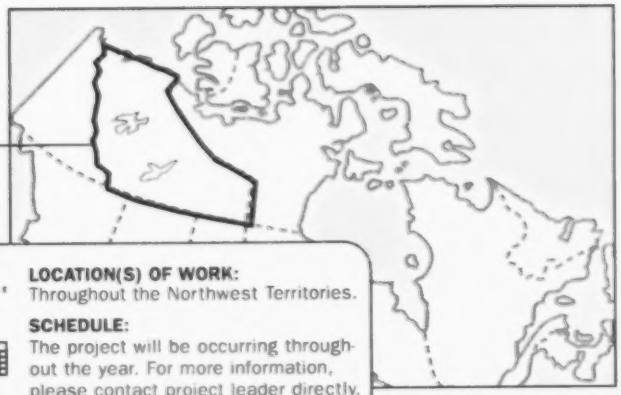
NWT Environmental Contaminants Committee

Q How do we make sure that people in the NWT find out more about **contaminants** research and have opportunities to get involved in the **Northern Contaminants Program (NCP)**?

RELEVANCE:
The Northern Contaminants Program (NCP) has evolved to include NWT communities and regions in research and communication efforts. This has increased the need to have a NWT Environmental Contaminants Committee (NWT ECC) to co-ordinate contaminants information and research initiatives. The NWT ECC is composed of representatives from various departments in the federal and territorial governments as well as national and regional Aboriginal partners. Each representative is actively involved in either environmental or human health activities which enables the Committee to make decisions on most contaminant related issues. The NWT ECC also provides the opportunity for researchers and communities to express their concerns and provide input into contaminants activities. The Department of Indian Affairs and Northern Development Yellowknife office provides secretariat support and the chair to the NWT ECC, and supports a representative in the NCP Management Committee.

PROJECT SUMMARY:
The NWT ECC will facilitate scientific study and assessment, and communication of information to northerners on the presence and possible effects of contaminants in air, land, water, fish, wildlife and humans. NWT ECC members will review all project proposals in the NWT for socio-cultural content as well as all NWT-based communications initiatives. The NWT ECC will continue to develop a communications network which will make sure that people are informed and involved in contaminant activities. A resource centre will continue to act as a storehouse of environmental contaminants information. Both the communications network and resource centre will help transfer contaminants information among NWT northerners, researchers, the NCP and other contaminants related programs. Several committee meetings will take place this year, and the minutes or summary of each meeting will be made available to anyone interested.

The Committee is also assisting in creating the new Nunavut Contaminants Committee.



LOCATION(S) OF WORK:
Throughout the Northwest Territories.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Carole Mills
Contaminants Division
Department of Indian Affairs
and Northern Development (DIAND)
Northwest Territories Region
P.O. Box 1500
Yellowkife, NT
X1A 2R3

Phone: (867) 669-2665
Fax: (867) 669-2833
E-Mail: millsc@inac.gc.ca

TIME FRAME:
April 1999 – March 2000. Reports and minutes from meetings and a year-end report of activities will be made available.

RELATED PROJECTS:
Related projects include "Yukon Contaminants Committee Communications Program", page 8 in booklet and "Interim Nunavut Environmental Contaminants Committee", page 46 in booklet.

Contaminants in Burbot from Fort Good Hope, Northwest Territories (NWT)

Q What are the changes over time of **organochlorines (OCs)**, **organobromines** and **heavy metals** in burbot from Fort Good Hope, Northwest Territories (NWT)?

RELEVANCE:

Little is known about levels of organochlorines, organobromines, and heavy metals in fish in Arctic marine and freshwater environments and about any changes that might be occurring in these levels over time. Much of the information that is available has limited scientific value because it is based on too few samples. Therefore, there is a need for a well-designed study on changes in contaminant levels over time at a location where much information exists on **contaminants**, fish and the environment. Burbot is a predatory, bottom-feeding fish species that is suitable for monitoring contaminants. As well, comprehensive data exist for OCs in livers and for **mercury**, **selenium** and **arsenic** in muscle and liver of burbot from the Fort Good Hope area.

This study will contribute to risk assessment of organochlorine, organobromine and heavy metal exposure to northerners, and assist in supporting Canada's case for better international controls.

PROJECT SUMMARY:

This project will study changes over time of levels of OCs, organobromines and heavy metals in livers of burbot from the Fort Good Hope area. The livers of 20 burbot from the Mackenzie River at Rampart Rapids will be collected in the late fall or early winter and analyzed. These analyses will determine if contaminant levels in fish and exposure to people who consume them as part of their traditional diet are increasing or decreasing over time.

LOCATION(S) OF WORK:
1. Fort Good Hope area, NWT.
2. Freshwater Institute Laboratory, Winnipeg, Manitoba

SCHEDULE:
Samples will be collected in late fall or early winter. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Gary Stern and Lyle Lockhart
Freshwater Institute
Department of Fisheries and Oceans
501 University Cr.
Winnipeg, MB
R3T 2N6

Phone: (204) 984-6761 (Gary Stern)
(204) 983-7113 (Lyle Lockhart)
Fax: (204) 984-2403
E-Mail: sternq@dfo-mpo.gc.ca
lockhartl@dfo-mpo.gc.ca

Local contact: George Low
Department of Fisheries and Oceans
4203 Mackenzie Highway
Hay River, NT
X0E 0R9

Phone: (867) 874-5575
E-Mail: lowg@dfo-mpo.gc.ca

TIME FRAME:
April 1999 – March 2003. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Mercury in Fish from Lakes in the Western Northwest Territories (NWT)", page 30 in booklet, "Mercury in Predatory Fish in the Mackenzie River Basin", page 32 in booklet, and "Contaminants and Heavy Metals in Fish from Great Slave Lake and Slave River", page 34 in booklet.

Mercury in Fish from Lakes in the Western Northwest Territories (NWT)

Q What are the **mercury**, **selenium** and **arsenic** levels in fish from western Northwest Territories (NWT) lakes that are important to subsistence fishing?

RELEVANCE:

Mercury levels in Arctic seals and whales and in sediment cores from a number of lakes in the NWT suggest that the amount of mercury transported to northern Canada has increased over time. Mercury levels in larger fish from some NWT lakes may exceed levels recommended for human consumption, and those fish feeding near the top of the **food chain** (walleye, pike, lake trout) often contain levels high enough to require **food consumption advisories**. Given these considerations, it is important to assess levels of mercury in fish harvested now, or being assessed for potential harvest.

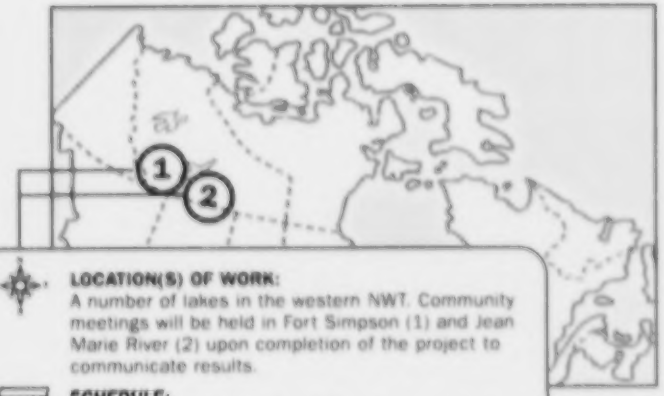
Most mercury in fish is present as the **toxic** form of **methylmercury**. Studies have shown that selenium in fish is effective in protecting against methylmercury poisoning. Analyzing for levels of selenium as well as mercury in fish tissues could be useful in future risk assessments.

There is evidence for relatively high levels of arsenic in some burbot from the lower Mackenzie River. However, there is a general lack of data on arsenic levels in fish throughout the NWT.

PROJECT SUMMARY:

This project will investigate the presence and geographic distribution of mercury, selenium and arsenic in fish from lakes in the western NWT that are able to sustain yields of fish for subsistence consumption. The overall purpose is to develop a management strategy for recommending levels of consumption based on species and size of fish on a lake-by-lake basis. Sampling will be conducted following community meetings to select lakes to be surveyed. It is proposed that four lakes will be surveyed, and that three fish species from each lake will be sampled.

Community meetings will be held in Fort Simpson and Jean Marie River as soon as possible after results have been obtained.



LOCATION(S) OF WORK:
A number of lakes in the western NWT. Community meetings will be held in Fort Simpson (1) and Jean Marie River (2) upon completion of the project to communicate results.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Lyle Lockhart
Freshwater Institute
Department of Fisheries and Oceans
501 University Cr.
Winnipeg, MB R3T 2N6

Phone: (204) 983-7113
Fax: (204) 984-2403
E-Mail: lockhartl@dfo-mpo.gc.ca

Marlene Evans
National Hydrology Research Institute
Environment Canada
11 Innovation Boulevard,
Saskatoon, SK S7N 3H5

Phone: (306) 975-5310
Fax: (306) 975-5143
E-Mail: marlene.evans@ec.gc.ca

Local contact: George Low
Department of Fisheries and Oceans
4203 Mackenzie Highway
Hay River, NT X0E 0R9

Phone: (867) 874-5575
E-Mail: lowg@dfo-mpo.gc.ca

TIME FRAME:
April 1998 – March 2001. A report will be made available upon completion of the project and results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Contaminants in Burbot from Fort Good Hope, Northwest Territories", page 28 in booklet, "Mercury in Predatory Fish in the Mackenzie River Basin", page 32 in booklet, and "Contaminants and Heavy Metals in Fish from Great Slave Lake and Slave River", page 34 in booklet.

Mercury in Predatory Fish in the Mackenzie River Basin

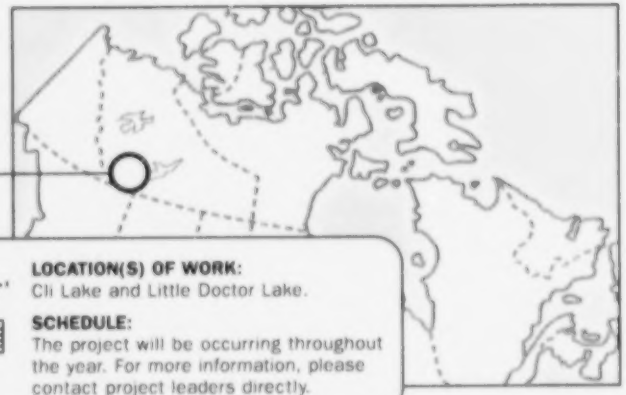
Q What are the factors affecting high **mercury** levels in predatory fish in the Mackenzie River Basin?

RELEVANCE:
Fish are an important natural resource for communities living in the Mackenzie River Basin. They are important for subsistence fisheries and in maintaining cultural values in the North. Studies have revealed that there are large lake-to-lake variations in mercury levels in predatory fish, particularly in the Mackenzie River Basin. Mercury levels may be high in some lakes because large amounts of mercury are coming into these lakes with stream inflow or from the atmosphere. They also may be high because of natural characteristics of some of the lakes (and streams) which change mercury into a form where it can be absorbed by plants and animals. Therefore, high mercury levels may be a naturally occurring feature of these lakes or they may be due to a more recent event like atmospheric transport from sources outside the Arctic. This study is designed to investigate what characteristics of lakes are most important for determining mercury levels.

PROJECT SUMMARY:
This study is investigating why predatory (fish-eating) fish such as pike, walleye and lake trout in some lakes in the Mackenzie River Basin have high concentrations of mercury in their tissue. Baseline studies of these lakes will be conducted to determine their depth, nutrient levels, and the types of plants and animals that live there. These studies will allow researchers to better investigate the factors affecting high mercury concentrations in predatory fish.

Most of the work will be conducted at Cli lake, west of Fort Simpson. Lake trout in this lake have very high mercury levels. Little Doctor Lake, nearby Cli Lake, where mercury levels are high in pike and walleye, will also be investigated. Cli Lake has very clear water while Little Doctor Lake has tea-coloured water. Water colour, through chemical reactions, may affect how much mercury enters and stays in the lake.

This study will attempt to determine whether or not remedial actions can be developed to reduce this human health and environmental concern.



LOCATION(S) OF WORK:
Cli Lake and Little Doctor Lake.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Marlene Evans
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Environment Canada
11 Innovation Boulevard,
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E-Mail: marlene.evans@ec.gc.ca

Lyle Lockhart
Freshwater Institute
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Winnipeg, MB R3T 2N6

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E-Mail: lockhartl@dfo-mpo.gc.ca

Local Contact: George Low
Department of Fisheries and Oceans
4203 Mackenzie Highway
Hay River, NT X0E 0R9

Phone: (867) 874-2331
E-Mail: lowg@dfo-mpo.gc.ca

TIME FRAME:
April 1998 – March 2003. A progress report will be submitted to Fort Simpson each year and a final report will be prepared after all field sampling and laboratory analyses are complete. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

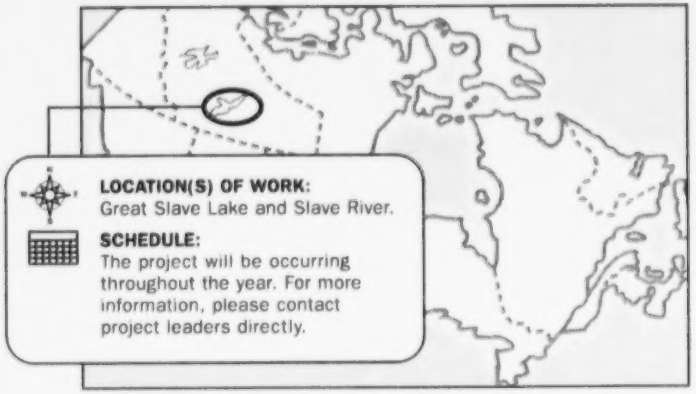
RELATED PROJECTS:
Related projects include "Contaminants in Burbot from Fort Good Hope, Northwest Territories", page 28 in booklet, "Mercury in Fish from Lakes in the Western Northwest Territories (NWT)", page 30 in booklet, and "Contaminants and Heavy Metals in Fish from Great Slave Lake and Slave River", page 34 in booklet.

Contaminants and Heavy Metals in Fish from Great Slave Lake and Slave River

Q What are the trends in **persistent organic pollutants (POPs)** and **heavy metals** in fish species of Great Slave Lake and the Slave River?

RELEVANCE:
Trends of **contaminant** levels in biota over time and their geographic distribution are not well known. Therefore, a long-term biomonitoring program to determine contaminant trends and distribution is needed. Fish are thought to be the best organism for the biomonitoring of contaminant trends in freshwater environments. Great Slave Lake, including the Slave River, has been selected as a study site for the long-term biomonitoring of organic and inorganic contaminant trends in the Mackenzie River Basin. The reasons for selecting the Great Slave Lake area are the availability of results from previous studies of inorganic and organic contaminants in the area, the availability of **archived** fish samples collected during these studies, and general knowledge about the local water system and the fish ecology.

PROJECT SUMMARY:
Burbot (from the Slave River at Fort Smith, Resolution Bay, and either in the East or North Arm), lake trout (from the West Basin and East Arm), and walleye (from Resolution Bay and the Slave River) will be sampled. This sampling will be done annually although not all specimens and species will be analyzed in a given year. The focus of this project will be on POPs, however fish will also be analyzed for **mercury**, **selenium**, and **arsenic**. Samples will also be prepared for future **dioxin** analysis. Some archived samples will be reanalyzed to improve the quality and quantity of existing data.



LOCATION(S) OF WORK:
Great Slave Lake and Slave River.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Marlene Evans
National Water Research Institute
Environment Canada
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Local Contact: George Low
Department of Fisheries and Oceans
4203 Mackenzie Highway
Hay River, NT X0E 0R9

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TIME FRAME:
April 1999 – March 2003. Results will be prepared in a progress report which will be made available to communities each year. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

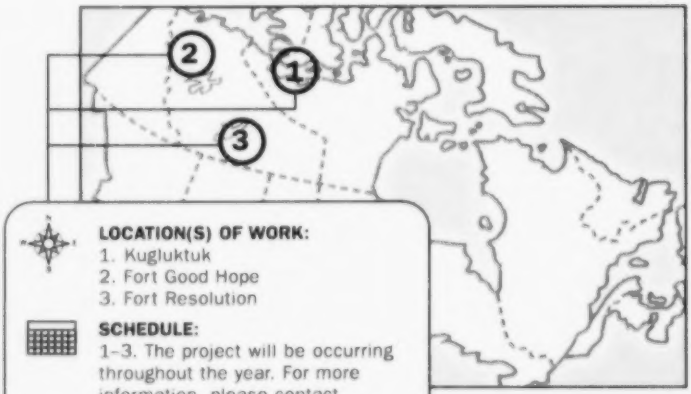
RELATED PROJECTS:
Related projects include "Contaminants in Burbot from Fort Good Hope, Northwest Territories", page 28 in booklet, "Mercury in Fish from Lakes in the Western Northwest Territories (NWT)", page 30 in booklet, and "Mercury in Predatory Fish in the Mackenzie River Basin", page 32 in booklet.

Community-Based Monitoring of Abnormalities in Wildlife

Q Is there a connection between **contaminants** in the environment and hunter-observed changes and abnormalities in wildlife?

RELEVANCE:
Recently, hunters and elders have observed changes in wildlife health. It is not known if these changes are occurring naturally, or are due to the presence of contaminants or other factors. Documenting the occurrence of these changes is the first step in understanding why they are taking place. This may also help to identify problems requiring further investigation. Local hunters have developed a wealth of experience and understanding of the ecosystems in which they live through their land-based subsistence lifestyles. They can recognize changes in animals and trends in the occurrence of some conditions over time.

PROJECT SUMMARY:
This project is a pilot (practice) study to design and implement a community-based monitoring system for collecting and communicating information from hunters and elders on unusual changes that may have been noticed in wildlife populations. This will provide an "early warning system" to detect changes in wildlife health at an ecosystem level and may identify areas for further study. Three communities that reflect regional differences in wildlife species and harvesting patterns have been selected. They are Kugluktuk (Arctic coast), Fort Good Hope (Mackenzie Valley) and Fort Resolution (Slave River Delta). The project will include workshops on local wildlife health and sampling techniques and on abnormalities in harvested wildlife, collection of samples from hunters for testing, organized field collections to provide baseline data to validate results from community-based sampling, and a traditional knowledge (TK) survey of disease and abnormalities in wildlife. This project will help integrate western science and TK to increase understanding of changes in wildlife health, and build the capacities of communities to identify, investigate and respond to changes in wildlife resources.



LOCATION(S) OF WORK:
1. Kugluktuk
2. Fort Good Hope
3. Fort Resolution

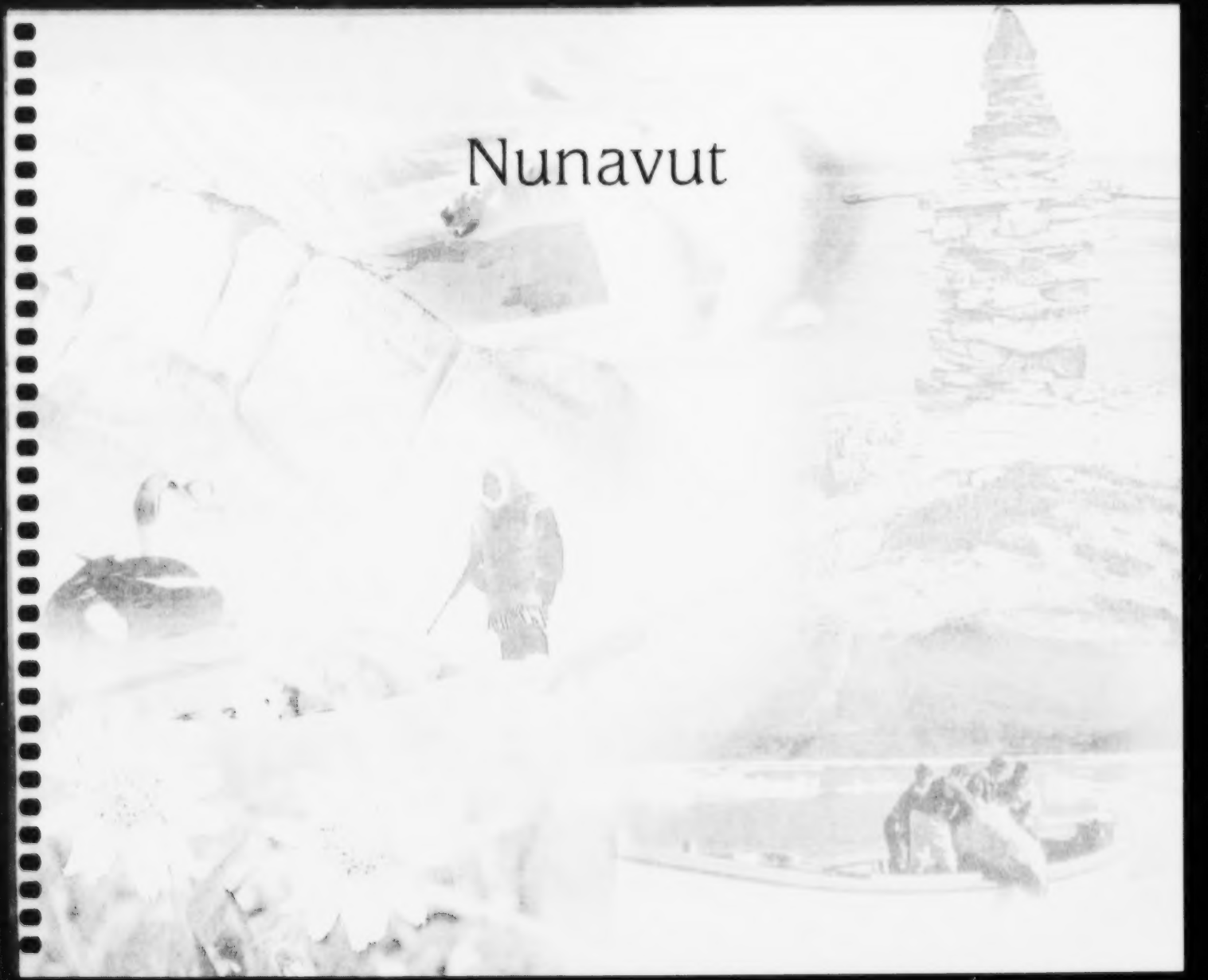
SCHEDULE:
1–3. The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Brett Elkin
Wildlife and Fisheries Division
Government of Northwest Territories
600, 5102 – 50th Avenue, Yellowk:fe, NT
X1A 3S8

Phone: (867) 873-7761
Fax: (867) 873-0293
E-Mail: brett_elkin@gov.nt.ca

TIME FRAME:
April 1997 – March 2003. A community-based monitoring system and user-friendly resource package will be developed and made available for community use. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

Nunavut

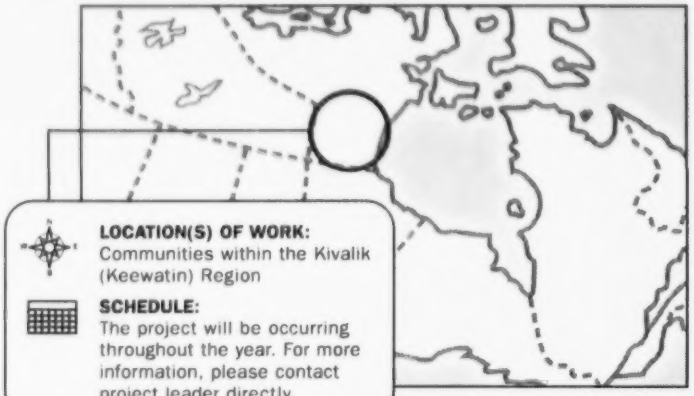


Frontline Training Course for Community Professionals

Q What is being done to ensure that key people at the community level have the training to deal with information on contaminants?

RELEVANCE:
The frontline training course was developed for professionals working in Northern communities who may be asked to deal with contaminant information as part of their work. As well as an overview of the **Northern Contaminants Program (NCP)** and its major findings to date, participants take part in a number of activities designed to show different ways of communicating contaminant information. The course also stresses the nutritional, economic and cultural aspects surrounding the issue of harvesting traditional food species.

PROJECT SUMMARY:
The Frontline Training Course for Community Professionals has been tested and delivered throughout a number of communities across the Northwest Territories and Nunavut (Iqaluit, Aklavik and Yellowknife). The previously developed course manual will be reviewed and revised as necessary for delivery to Kivalik professionals. An assistant instructor, from the region, will be trained for course delivery, as part of the capacity building process. Course participants will be provided with a general understanding of contaminants issues, and knowledge on how to access sources of information, expertise, and other resources on contaminants issues. Participants will also gain an understanding of research methods which will help them address and evaluate research proposals, identify potential opportunities for community involvement and communicate with scientists wishing to conduct work in their community.



LOCATION(S) OF WORK:
Communities within the Kivalik (Keewatin) Region

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Judy Farrow
Director
Environment Division,
Métis Nation – NWT
P.O. Box 1375
Yellowknife, NT
X1A 2P1

Phone: (867) 873-3505
Fax: (867) 873-3395
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TIME FRAME:
April 1999 – March 2000.

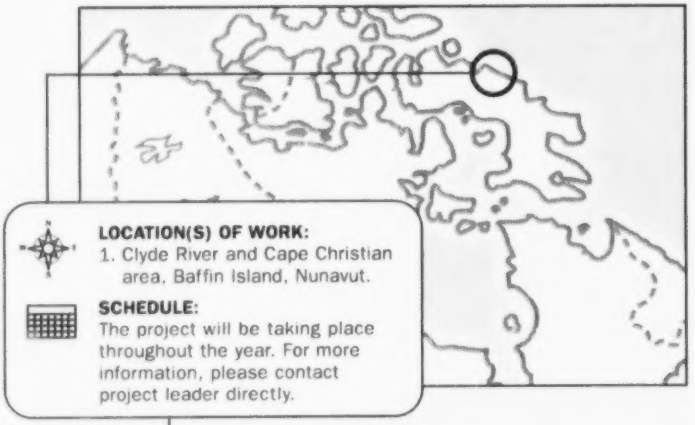
RELATED PROJECTS:
Related projects include "Training and Support for Regional Contaminant Coordinators (RCCs)", page 19 in booklet.

Response to Environmental Contaminants Information at Clyde River and Cape Christian

Q Has the way hunters use the Clyde River and Cape Christian areas changed over past years as a result of **contaminant** concerns?

RELEVANCE:
PCB contamination in soil was found nearby a former United States Coast Guard station at Cape Christian, Baffin Island in the early 1990s. A clean up of the Cape Christian site was undertaken as this marine area, known locally as Pikaluit, was an important winter sealing and polar bear hunting area for the Clyde Inuit. Inuit were advised to avoid the lands adjacent to the station area, however no warnings were issued regarding the consumption of local wildlife. Clyde hunters have expressed concern about the condition of lands at Cape Christian and the potential hazard of consuming seals and polar bears from within the Pikaluit area. The proposed research intends to investigate the degree to which Inuit concerns about PCBs have affected the subsistence patterns of Clyde River peoples.

PROJECT SUMMARY:
This project will determine whether information provided to the people of Clyde about PCB contamination at Cape Christian has affected the way hunters use that area and the adjoining waters and sea ice, particularly for winter seal hunting. The project will also investigate how the Inuit decide animals harvested from the Cape Christian area are suitable for consumption as compared to animals taken from other locations. Information will be gathered by examining government records about the contaminants situation at Cape Christian, by surveying 20 Inuit households, and by observing winter hunting for seals.



LOCATION(S) OF WORK:
1. Clyde River and Cape Christian area, Baffin Island, Nunavut.

SCHEDULE:
The project will be taking place throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: George Wenzel
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H3A 2K6

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TIME FRAME:
April 1999 – March 2000. A final project report will be completed and made available to interested parties by May, 2000.

A Five-Year Inuit Strategy of Communication and Action on Contaminants in the Arctic Environment

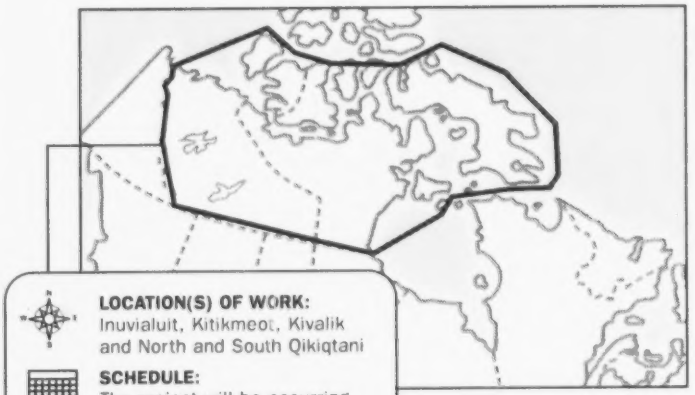
Q What is being done to ensure communication of **contaminants** information to Inuit at the community level?

RELEVANCE:
At the Eastern Arctic Contaminant Workshop in Iqaluit in December 1998, an urgent need for more regional contaminant co-ordinators (RCCs), especially in the eastern Arctic, was identified. This need arises from a history of miscommunication regarding contaminant issues in Inuit communities. The diverse regions of Inuvialuit, Kitikmeot, Kivalik and Qikiqtani were identified as needing the services of RCCs.

RCCs would facilitate communication of contaminants information among communities, regions, organizations, and **Northern Contaminants Program (NCP)** scientists, and help reduce instances of alarm, apprehension and mistrust.

PROJECT SUMMARY:
This project will ensure that regional RCCs are put in place in the Inuvialuit, Kitikmeot, Kivalik, North Qikqtani and South Qikiqtani regions to provide contaminants information and education to communities, to assist communities to play a role in the NCP, and to provide the NCP with input from communities regarding their interests and concerns about contaminants in the **food chain**.

Examples of activities RCCs will be involved in include: participating in territorial/regional contaminant committees, acting as a liaison, where required and appropriate, between communities and local/regional boards such as Health Boards and Band Councils, providing updates on contaminant issues at assemblies and meetings where appropriate, and developing resource material for the region through consultation. RCCs will also provide technical support to northern communities by helping to identify research priorities and proposals for the NCP and other funding bodies, and by acting as a resource person for regional studies. Finally, RCCs will act as a contact for NCP researchers for consulting the community on project proposals, negotiating research agreements for funded projects, and reporting on project results.



LOCATION(S) OF WORK:
Inuvialuit, Kitikmeot, Kivalik and North and South Qikiqtani

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Terry Forth
Nunavut Tunngavik Inc.
Iqaluit, NT
X0A 0H0

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Fax: (867) 979-3240
E-Mail: tforth@tunngavik.com

Scott Nickels and Eric Loring
Inuit Tapirisat of Canada
Suite 501, 170 Laurier Avenue West
Ottawa, ON, K1P 5V5

Phone: (613) 238-8181
Fax: (613) 234-1991
E-Mail: itc@magi.com

TIME FRAME:
April 1999 – March 2000. A number of reports and summaries will be produced throughout the year and a final activity report will be made available shortly after March 2000.

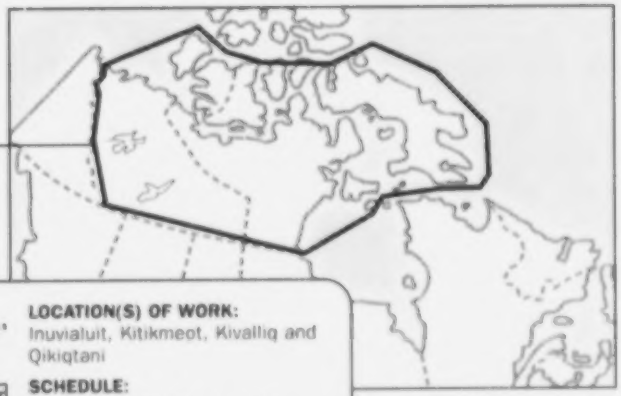
RELATED PROJECTS:
Related projects include "Training and Support for Regional Contaminant Coordinators (RCCs)", page 19 in booklet and "Regional Contaminants Co-ordinator (RCC): Gwich'in Tribal Council", page 24 in booklet.

Development of an Inuit Indigenous Knowledge Database

Q How can we have easier access to traditional knowledge (TK) for planning, problem solving and decision making?

RELEVANCE:
Traditional Inuit knowledge has been identified as a tangible and comprehensive resource. Many Inuit feel hindered in their ability to participate effectively in **contaminants**-related issues because that they do not have "a place to go" to find their own information. At the December 1998 Eastern Arctic Contaminants Workshop, Inuit community representatives called for the establishment of an accessible source of information based on their own knowledge. This source of information will enable Inuit to identify and access their own culturally relevant information for the planning, problem solving and decision making required for their full and effective participation.

PROJECT SUMMARY:
This project will plan, develop and test a culturally appropriate prototype for an Inuit knowledge database. Inuit ecological and land-use knowledge will be the primary information available on the database. The final product of a fully functioning Inuit knowledge database will be approached in stages. The first stage, the development of a prototype database, will provide the content, structure, applications and costs of the database for both Inuit and the NCP researchers. The project will be expanded to include the entire Canadian Inuit territory once the prototype is developed, evaluated and approved, and the appropriateness of its structure assured at the community and regional levels.



LOCATION(S) OF WORK:
Inuvialuit, Kitikmeot, Kivalliq and Qikiqtani

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Eric Loring and Scott Nickels
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Ottawa, ON
K1P 5V5

Phone: (613) 238-8181
Fax: (613) 234-1991
E-Mail: itc@magi.com

TIME FRAME:
April 1999 – March 2003. Expansion and implementation of the database throughout the entire Canadian Inuit territory and appropriate northern operating centres is expected to occur in March, 2004.

Eastern Arctic Workshop Tour

Q What can be done to better communicate **contaminant** information to Eastern Arctic communities?

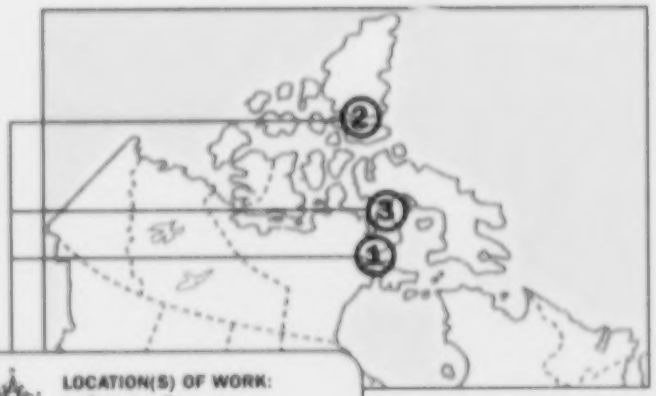
RELEVANCE:

One way to convey **Northern Contaminants Program (NCP)** research results and information has been to conduct a workshop which involves bringing selected community representatives to a central location, and providing them with information regarding contaminants and the program. It has been the hope that those representatives will spread the word to the rest of the community. By using this method, there is the problem of information overload and the potential for the wrong interpretation of the results.

An alternative method of delivering the contaminant and program related information is to send a small knowledgeable team to a community for a couple of days. Advantages of going to a community are that more community members would be reached and they would be hearing the message from the source who would be able to answer questions immediately. Also, there is a level of comfort for community members since they are with their families and neighbours and may feel more free to speak out about the program. Another benefit of this method is the relationship building and economic support (through accommodations, meals, souvenir shopping, etc.) that occurs while in the community.

PROJECT SUMMARY:

At least three communities in Nunavut will be visited by teams consisting of an NCP representative, an aboriginal partner, a health specialist and a scientist. These communities include Repulse Bay, Grise Fjord, and Igloolik. The purpose of these visits is to communicate the goals and priorities of the NCP, to discuss current contaminant projects in the area, to identify issues and concerns of Nunavut communities about contaminants in the environment and to assist in making informed decisions about the use of traditional foods. Prior to each visit, a community liaison person will be hired to help organize meetings and events, and to provide a point of contact for any further work. The team will also take advantage of the time in the community to meet with the Hunters and Trappers organizations, the Hamlet Council, the schools and any interested groups. A trip report will be prepared outlining the comments and concerns that each community had.



LOCATION(S) OF WORK:
1. Repulse Bay
2. Grise Fjord
3. Igloolik.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Carole Mills
Contaminants Division
Department of Indian Affairs and
Northern Development (DIAND)
Northwest Territories Region
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Yellowkife, NT
X1A 2R3

Phone: (867) 669-2665
Fax: (867) 669-2833
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170 Laurier Ave. W.,
Ottawa, ON
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TIME FRAME:
April 1999 – March 2000. A report summarizing the results workshops will be produced upon completion of the project.

Interim Nunavut Environmental Contaminants Committee

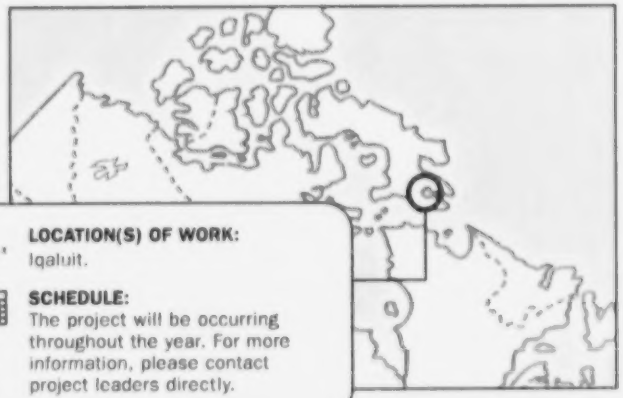
Q How can people in Nunavut find out more about contaminants research and get involved in the Northern Contaminants Program (NCP).

RELEVANCE:
The NCP has evolved to include Northwest Territories (NWT) and Yukon communities extensively in research and communication efforts. The creation of the NWT Environmental Contaminants Committee (NWT ECC) provided northerners with an avenue for meaningful input into NCP research and communication activities, a means to develop partnerships with researchers, and a forum to express concerns.

However, with the creation of Nunavut on April 1st, 1999, it is now necessary that a separate contaminants committee be established to serve the unique interests and concerns of Inuit in Canada's newest Territory. Other important factors that support a different approach to dealing with contaminant issues in Nunavut include the potentially greater contaminant related health risks from a marine **mammal**-based traditional diet, and the geographically dispersed and isolated Inuit communities in Nunavut.

PROJECT SUMMARY:
The Nunavut Environmental Contaminants Committee (NECC) will facilitate the process of collaborative study, assessment and communication of information to Nunavut residents about the presence and possible effects of contaminants in the air, land, water, fish, wildlife and humans.

The NECC will draw its membership from key public bodies responsible for fish and wildlife harvesting, environmental impact and land use, research, and health issues throughout Nunavut. These regionally distributed agencies liaise directly with Nunavut communities, which will allow the NECC front line access to grassroots concerns, information gaps and research priorities regarding contaminants. This project will support the development of the NECC terms of reference and a workshop in September or October 1999 to finalize NECC membership, complete the terms of reference and the criteria and process to review NCP Nunavut proposals. Nunavut representatives will continue to participate in the NWT ECC until the NECC is established.



LOCATION(S) OF WORK:
Iqaluit.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Jamal (James) Shirley
Science and Technology Services
Nunavut Research Institute
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X0A 0H0

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Fax: (867) 979-4681
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X1A 2R3

Phone: (867) 669-2665
Fax: (867) 669-2833
E-Mail: millsc@inac.gc.ca

TIME FRAME:
April 1999 – March 2000.

RELATED PROJECTS:
Related Projects include "NWT Environmental Contaminants Committee", page 26 in booklet and "Yukon Contaminants Committee Communications Program", page 9 in booklet.

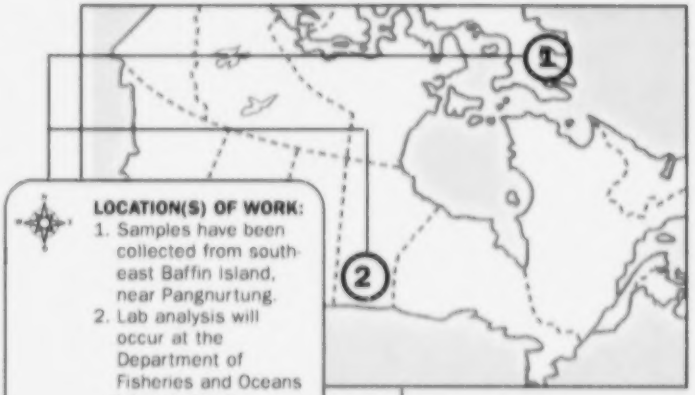
Contaminants in Southeast Baffin Island Beluga

Q What are the changes over time of **contaminants** in southeast Baffin Island beluga?

RELEVANCE:
Polybrominated biphenyls (PBBs) and **brominated diphenyl ethers (BDPEs)** are found in plastic materials and used as flame retardants in many products. Over the past two decades, the use of these flame retardants has increased substantially. As a result, PBBs and BDPEs have been released into the environment. PBBs and BDPEs are similar in behaviour and **toxicity** to other environmental contaminants such as **PCBs** and **DDT**. Both groups of chemicals are expected to **bioaccumulate**. BDPEs have been detected at low concentrations in ringed seal (Pangnirtung) and beluga blubber (Kimmirut) samples from southeast Baffin Island. The presence of BDPEs in these samples is clear evidence for atmospheric transport of BDPEs to the Arctic since there is no significant source of these **contaminants** in the Arctic.

Chlorinated diphenyl ethers (CDPEs) are a group of **organochlorine (OC)** contaminants formed in combustion processes or as by-products in the manufacturing of chlorophenyls. CDPEs are reported to be persistent in the environment and **toxic** to **immune systems**. CDPEs have been detected at low concentrations in fish, fish-eating birds and marine **mammals** from remote areas. However, little information is available on CDPEs.

PROJECT SUMMARY:
This project will investigate the changes in levels of PBBs, BDPEs and CDPEs in Arctic marine ecosystems over time. Blubber samples from southeast Baffin Island beluga collected earlier and analyzed for other **persistent organic pollutants (POPs)** will be analyzed for BDPEs and CDPEs. Blubber from 10 selected samples will be tested for PBBs. This will help determine whether contaminant levels in marine mammal tissues are increasing or decreasing with time, and contribute to overall risk assessments of contaminant exposures to northerners.



LOCATION(S) OF WORK:
1. Samples have been collected from southeast Baffin Island, near Pangnurtung.
2. Lab analysis will occur at the Department of Fisheries and Oceans laboratories in Winnipeg, Manitoba.

SCHEDULE:
1 & 2.Samples will be analysed this year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Gary Stern
Freshwater Institute
Department of Fisheries and Oceans
501 University Cr.
Winnipeg, MB
R3T 2N6

Phone: (204) 984-6761
Fax: (204) 984-2403
E-Mail: sternq@dfo-mpo.gc.ca

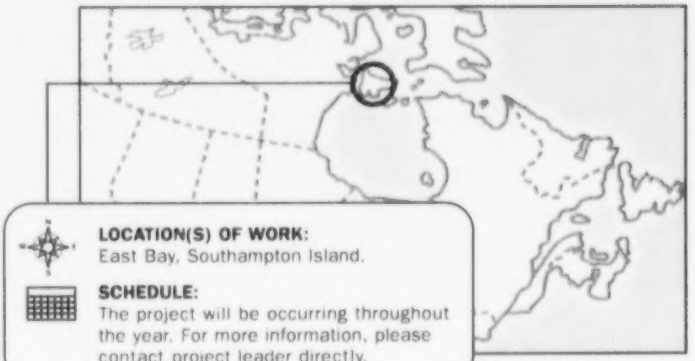
TIME FRAME:
April 1999 – March 2003. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

Levels and Effects of Contaminants in Arctic Seaducks

Q What are the levels of **heavy metals** found in Arctic seaducks, and are they having any effects?

RELEVANCE:
Contaminants have been found in Arctic wildlife, including seabirds that nest in the North. It is not known what effects these contaminants will have on northern wildlife. Some populations of seaducks have declined recently. This study will determine if there is a relationship between the health of the ducks and levels of contaminants in the ducks.

PROJECT SUMMARY:
Common eiders will be sampled at East Bay Southampton Island. This project is part of a larger study of common and king eider ecology being conducted at East Bay. Levels of heavy metals (**mercury**, **cadmium**, and **selenium**) will be measured in the blood, livers, and kidneys of birds sampled. In addition, researchers will evaluate the health of the birds by measuring body condition, endocrine status and immune function. The results of the project will be forwarded to Health Canada in order to assess human exposure to contaminants through the consumption of these birds as part of a northern traditional diet.



LOCATION(S) OF WORK:
East Bay, Southampton Island.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Mark Wayland
Canadian Wildlife Service
Prairie and Northern Wildlife Research Centre
Environment Canada
115 Perimeter Road
Saskatoon, SK
S7N 0X4

Phone: (306) 975-6340
Fax: (306) 975-4089
E-Mail: mark.wayland@ec.gc.ca

TIME FRAME:
April 1997 – March 2003. Results of the project will be reviewed and communicated back to northern communities. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Role of Heavy Metal Contaminants in Seaduck Population Declines", page 102 in booklet.

Effects of Persistent Organic Pollutants (POPs) on Polar Bears

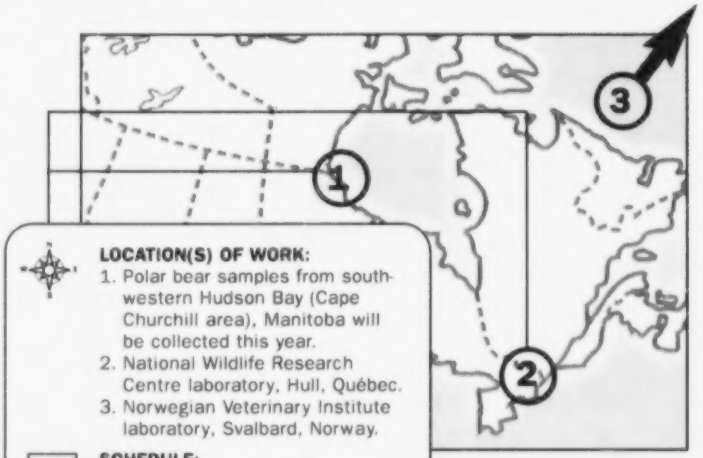
Q Is the **immune system** of polar bears affected by exposure to **persistent organic pollutants (POPs)**? What are the effects on polar bear growth and health?

RELEVANCE:
Polar bears are found at the top of the Arctic **food chain**. Because of this, they tend to have much higher levels of POPs, such as **PCBs**, in their fat compared to other animals. The geographic distribution of POPs found in polar bears has been thoroughly studied. It has been found that bears from the European Arctic, east of Greenland, have the highest levels of PCBs, and bears from Alaska have the lowest levels. Concentrations tend to increase from west to east in the Canadian Arctic. PCB exposure can result in a decreased functioning of the **immune system**, which makes bears less able to fight infection.

PROJECT SUMMARY:
This project will compare the immune systems of bears from a more contaminated area, Svalbard in the European Arctic, to bears from a less contaminated area, southwestern Hudson Bay in the Canadian Arctic. The Svalbard study has already been done. The Canadian portion of the study will be completed in 1999. The study involves vaccinating captured bears, recapturing them 6 weeks later, and determining the amount of **antibodies** generated in the blood. Significant differences in the immune system response in Svalbard bears and in Canadian bears will be investigated to determine if these differences correlate with the level of PCB contamination.

This project will also study the **endocrine** disrupting effects of hydroxy PCB in blood. Hydroxy PCBs interfere with both **thyroid** hormone and vitamin A transport in blood, which are important for growth and maintenance of healthy tissues. Concentrations of hydroxy PCBs, thyroid hormones and vitamin A in Svalbard and Canadian bear blood will also be compared.

As well, liver tissue samples from Resolute and Churchill bears will be analyzed to study the effect of PCB exposure on **testosterone** metabolism in male polar bears.



LOCATION(S) OF WORK:
1. Polar bear samples from southwestern Hudson Bay (Cape Churchill area), Manitoba will be collected this year.
2. National Wildlife Research Centre laboratory, Hull, Québec.
3. Norwegian Veterinary Institute laboratory, Svalbard, Norway.

SCHEDULE:
1–3. The project will be occurring throughout the year. For more information, please contact project leader directly.

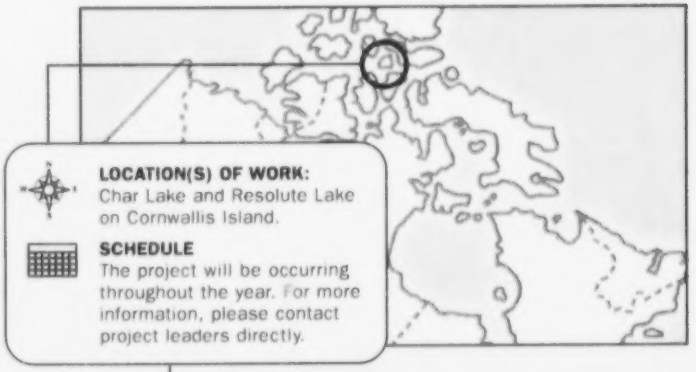
CONTACT INFORMATION:
Project Leader: Ross Norstrom
Canadian Wildlife Service
Environment Canada
100 Gamelin Blvd.
Hull, PQ
K1A 0H3

Phone: (819) 997-1411
Fax: (819) 993-6612
E-Mail: rnorstro@ccs.carleton.ca

TIME FRAME:
April 1998 – March 2000. Results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

Persistent Organic Pollutants (POPs) and Heavy Metals in Landlocked Char

Q What are the changes in levels of **persistent organic pollutants (POPs)** and **heavy metals** over time in landlocked char from Char Lake and Resolute Lake?



LOCATION(S) OF WORK:
Char Lake and Resolute Lake on Cornwallis Island.

SCHEDULE
The project will be occurring throughout the year. For more information, please contact project leaders directly.

RELEVANCE:
Freshwater fish are directly exposed to atmospheric **contaminants** deposited on snow or directly onto lake surfaces or watersheds. Fish accumulate contaminants and heavy metals from their diet and as they pass water over their gills. Unlike **mammals**, fish have limited capacity to break down POPs and thus they eliminate many of these chemicals very slowly. Fish are therefore good indicators of freshwater contamination by POPs and heavy metals. Little information on changes to these contaminants in fish is available.

Atmospheric levels of many POPs are expected to decline due to the signing of recent agreements by all circumpolar countries to reduce the use of POPs and therefore their long-range transport. If contaminant inputs to the lakes decline, then the contaminant levels in fish are expected to decline as well. The analysis of fish may also indicate if levels of other contaminants not regulated by the above agreements are increasing.

PROJECT SUMMARY:
This project will investigate changes in levels of contaminants over time in Arctic char from Char lake and Resolute Lake near Resolute and determine if they are increasing or decreasing. Char Lake has been selected because it is a well studied lake with a well known landlocked char population. Changes over time of levels of contaminants will be determined by analyzing about 10 fish from Char Lake annually for up to 6 years (1997-2003). Fish sampled from Resolute Lake will be **archived** for possible future analysis.

CONTACT INFORMATION:
Project Leaders: Derek Muir
National Water Research Institute,
Environment Canada
PO Box 5050, 867 Lakeshore Rd.
Burlington, ON
L7R 4A6

Phone: (905) 319-6921
Fax: (905) 336-6430
E-Mail: derek.muir@cciw.ca

Local Contact:
Resolute Bay Hunters and Trappers
Resolute, Nunavut

Phone: (867) 252-3800

TIME FRAME:
April 1997 – March 2003. Results on contaminant levels in char will be made available to community representatives and the Nunavut Contaminants Committee on a timely basis. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

Levels and Effects of Heavy Metals and Radionuclides in Caribou

Q Are the levels of **heavy metals** and **radionuclides** in caribou changing, and are they having any effects on the caribou?

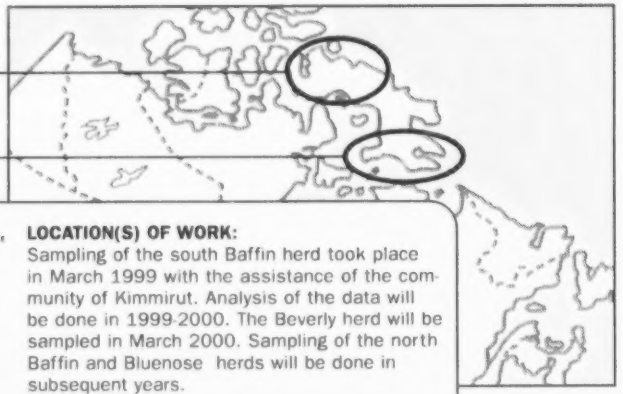
RELEVANCE:

Barren-ground caribou are found across northern Canada, and are a major component of the traditional diet in communities across the Northwest Territories (NWT) and Nunavut. Caribou are a good indicator species for terrestrial ecosystem contamination given their wide distribution across northern Canada, their simple air-lichen-caribou **food chain**, and their importance as a traditional food species. Because of their diet and long-lived nature, caribou can accumulate significant levels of heavy metals which has implications for both caribou health and human consumption.

Until recently, information on heavy metal and radionuclide **contaminants** in caribou in Canadian arctic and subarctic regions was extremely limited, and data on trends over time are nonexistent. During the 1990s, levels of heavy metal and radionuclide contaminants in caribou tissues from major barren-ground herds across the NWT were assessed. A wide range of contaminants were detected. This provided a good baseline to assess current exposure and to serve as a comparison for changes in contaminant levels in the future.

PROJECT SUMMARY:

Four caribou herds from across the NWT and Nunavut have been selected for study and monitoring. A different herd will be sampled each year. These samples will be used to determine heavy metal and radionuclide contaminant levels for an important country food species and if these levels are increasing, decreasing or remaining the same over time. Field collections will be planned and conducted in co-operation with local organizations of hunters and trappers.



LOCATION(S) OF WORK:
Sampling of the south Baffin herd took place in March 1999 with the assistance of the community of Kimmirut. Analysis of the data will be done in 1999-2000. The Beverly herd will be sampled in March 2000. Sampling of the north Baffin and Bluenose herds will be done in subsequent years.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Brett Elkin
Wildlife and Fisheries Division
Government of Northwest Territories
600, 5102 – 50th Avenue, Yellowknife, NT
X1A 3S8

Phone: (867) 873-7761
Fax: (867) 873-0293
E-Mail: brett_elkin@gov.nt.ca

TIME FRAME:
April 1997 – March 2003. Upon completion of the project, results will be presented to the participating communities. All print information (summary reports and posters) will be provided in English and Inuktitut. A report will be produced and presented at the **Annual Northern Contaminants Program (NCP)** Results Workshop.

New Persistent Chemicals in the Arctic Environment

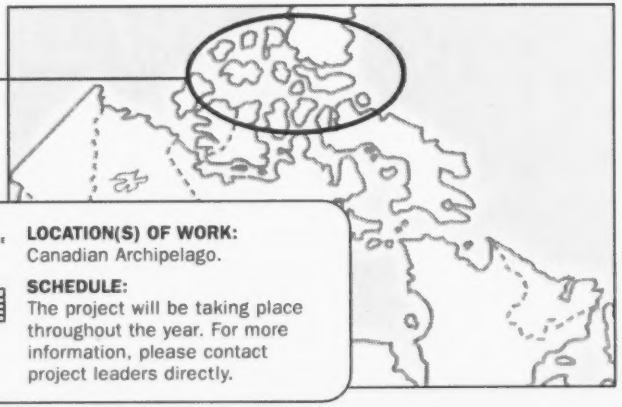
Q Are there any "new" chemicals in the Arctic environment that are not currently being monitored?

RELEVANCE:

If a chemical can be transported by air to the Arctic from a distance source region, it is probably resistant to breaking down in the environment. Many substances that break down quickly in warm climates are much more stable under cold conditions. This study will provide an early warning of such chemicals entering the Arctic. The presence of a new chemical in the Arctic is considered by Canada and international agencies to be a cautionary sign, signalling the need for evaluation of persistence and **toxic** effects under arctic conditions.

PROJECT SUMMARY:

Researchers will measure the levels of a number of "new" chemicals in samples of arctic air and water. "New" is used here to indicate that these substances have not been looked for in the Arctic until now. They may have been used and released into the environment further south for many years. Some of the chemicals that will be studied are **pesticides**, industrial chemicals and wood preservatives that are now used in Canada. Levels of these new chemicals are expected to be very low, since they are not used in the north to significant extents, and researchers need to develop methods that can detect their presence. Some of the new chemicals have already been identified in air and beluga from the initial phase of the study. Findings of the project will determine if new chemicals are entering the Arctic environment and the **food chain**, and indicate if there is a need to continue monitoring them in the future.



LOCATION(S) OF WORK:
Canadian Archipelago.

SCHEDULE:
The project will be taking place throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Terry Bidleman
Atmospheric Environment Service,
Environment Canada
4905 Dufferin Street, Downsview, ON
M3H 5T4

Phone: (416) 739-5730
Fax: (416) 739-5708
E-Mail: terry.bidleman@ec.gc.ca

Derek Muir
National Water Research Institute
Environment Canada
Burlington, ON
L7R 4A6

Phone: (905) 319-6921
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Gary Stern
Freshwater Institute,
Department of Fisheries and Oceans
501 University Crescent, Winnipeg, MB
R3T 2N6

Phone: (204) 98 -6761
Fax: (204) 984-2403
E-Mail: sterng@dfo-mpo.gc.ca

TIME FRAME:
April 1998 – March 2001. Results will be communicated to northern communities and data will be provided to indigenous people's organizations and to government agencies that are part of the **Northern Contaminants Program (NCP)**.

Atmospheric Mercury Measurements at Alert, Nunavut

Q How much **mercury** is transported to the Arctic via the atmosphere?

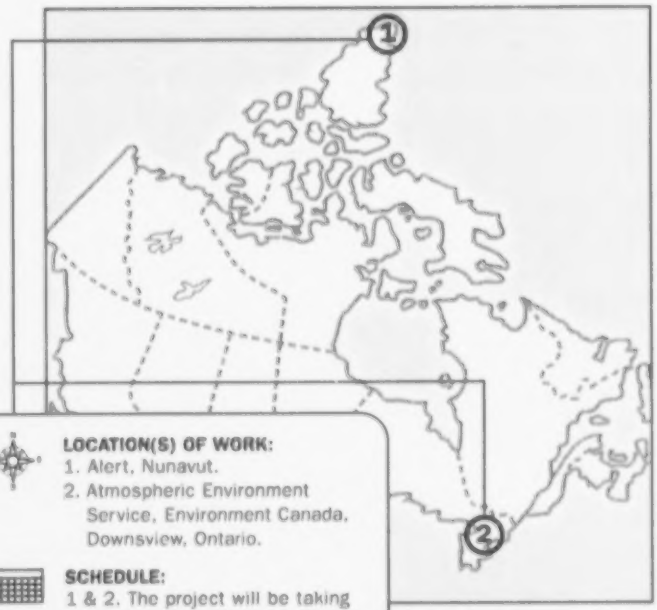
How much mercury is deposited from the air to Arctic land, water and vegetation?

What and where are the sources of the atmospheric mercury measured at Alert?

RELEVANCE:
Mercury is a **contaminant** of concern in the north because it **bioaccumulates** in Arctic **food chains**. Mercury is naturally present in Arctic rocks, soils and vegetation, but it is also transported to the Arctic in air from distant sources, many of which are related to human activity. This may be causing increases in mercury levels in the Arctic. The results from this study will help us to understand if this is happening or not.

PROJECT SUMMARY:
Levels of mercury in the atmosphere have been measured continuously at the air monitoring station near Alert on Ellesmere Island from 1995 to present day. This project will continue these measurements at this station for the next four years. Mercury in the atmosphere is found as mercury vapour and attached to airborne particles. Researchers will measure the levels of mercury in air both as a vapour and on particles. Mercury vapour generally stays airborne for months at a time, but particles can be deposited much more readily onto the land. Most of the particles are deposited with falling snow, but some are deposited in rain or directly from the air itself. Researchers will also measure the levels of mercury in the snow at this high Arctic air monitoring station.

Results from monitoring of the levels of mercury in the atmosphere and snow will be used to assess whether the levels are changing over time in the Arctic, and in the northern hemisphere in general. The results will also be used to describe how much of the mercury that is transported by the atmosphere, is actually deposited onto the land in the Arctic.



LOCATION(S) OF WORK:
1. Alert, Nunavut.
2. Atmospheric Environment Service, Environment Canada, Downsview, Ontario.

SCHEDULE:
1 & 2. The project will be taking place throughout the year. To find out exactly when and where the project will be occurring, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: William Schroeder
Atmospheric Environment Service
Environment Canada
4905 Dufferin St., Downsview, ON
M3H 5T4

Phone: (416) 739-4839
Fax: (416) 739-5708
E-Mail: bill.schroeder@ec.gc.ca

TIME FRAME:
April 1995 – March 2003. A number of contaminant related reports, publications and models will be made available upon completion of the project.

RELATED PROJECTS:
Related projects include "Mercury Transport in the Atmosphere: Identifying the Potential Routes of Contamination", page 78 in booklet.

Northern Contaminants Air Monitoring

Q Which contaminants are entering the Arctic by air, and in what amounts?

RELEVANCE:

Most of the **organochlorine (OC)** contaminants found in the Arctic are transported in air from sources outside the Arctic. Monitoring the levels of contaminants in air is necessary for assessing any changes in the types and amounts of contaminants transported to the Arctic over time. This study is part of a continuing monitoring program, and its results have been and will be used to negotiate international controls, and to see if those controls are working.

PROJECT SUMMARY:

Under the **Northern Contaminants Program (NCP)**, levels of contaminants in the Arctic atmosphere have been collected by Canadians over several years from three Canadian air monitoring stations (Alert, Tagish, Cape Dorset) and two stations in Russia (Dunai Island and Amderma). Over 150 contaminants in Arctic air have been monitored. Samples are collected by air filters which are then analysed to measure the amounts and types of contaminants that were in the sampled air.

The results from all five air monitoring stations will be used to test atmospheric chemical transport models that explain the transport of contaminants. Some computer models have been developed to explain how contaminants 'hop' from their sources in warm parts of the world to colder regions, such as the Arctic, where they can accumulate. These models need to be tested, and this can be done by comparing actual measured levels of contaminants in air, with the levels predicted by the models.

In this phase of the project, levels of OCs will be measured in air that was collected from 1994 to 1995 at the air monitoring station at Cape Dorset in the eastern Arctic and from 1992 to 1998 at Alert on Northern Ellesmere Island. This will provide baseline data on the levels of OCs in air from Nunavut.

LOCATION(S) OF WORK:
1. Alert
2. Cape Dorset
3. Freshwater Institute in Winnipeg

SCHEDULE:
1. Throughout 1998/99.
2 & 3. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Len Barrie
Atmospheric Environment Service
Environment Canada
4905 Dufferin St., Downsview, ON
M3H 5T4

Phone: (416) 739-4868
Fax: (416) 739-4224
E-Mail: len.barrie@ec.gc.ca

TIME FRAME:
April 1992 – March 2003.

Mercury and Other Contaminants in Lake Sediments from Devon Island

Q What are the levels of **mercury** and other **contaminants** in lake sediment? What can lake sediment tell us about modern and historic fluxes of contaminants in a specific area?

RELEVANCE:
Evidence suggests that recent inputs of a number of contaminants to northern Canada are greater than those from earlier pre-industrial times. Lake sediment studies are probably the best approach to understand the relative importance of recent versus historic inputs of mercury to the environment. Analysis of these sediments could also estimate the mercury contributions to the environment from natural versus human sources.

PROJECT SUMMARY:
This project will determine the amount of mercury and other contaminants (**lead**, **cesium** and **organochlorines**) in sediments from a lake on Devon Island, and calculate recent and historic contributions of contaminants at that site. It will also determine if inputs from several contaminants transported long distances can be detected in a remote lake.

LOCATION(S) OF WORK:
1. Devon Island
2. Freshwater Institute laboratory, Winnipeg, MB.
3. Geological Survey of Canada laboratory, Ottawa, ON.

SCHEDULE:
1, 2 & 3. The project will be taking place throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Lyle Lockhart and Gary Stern
Freshwater Institute
Department of Fisheries & Oceans
501 University Crescent, Winnipeg, MB
R3T 2N6

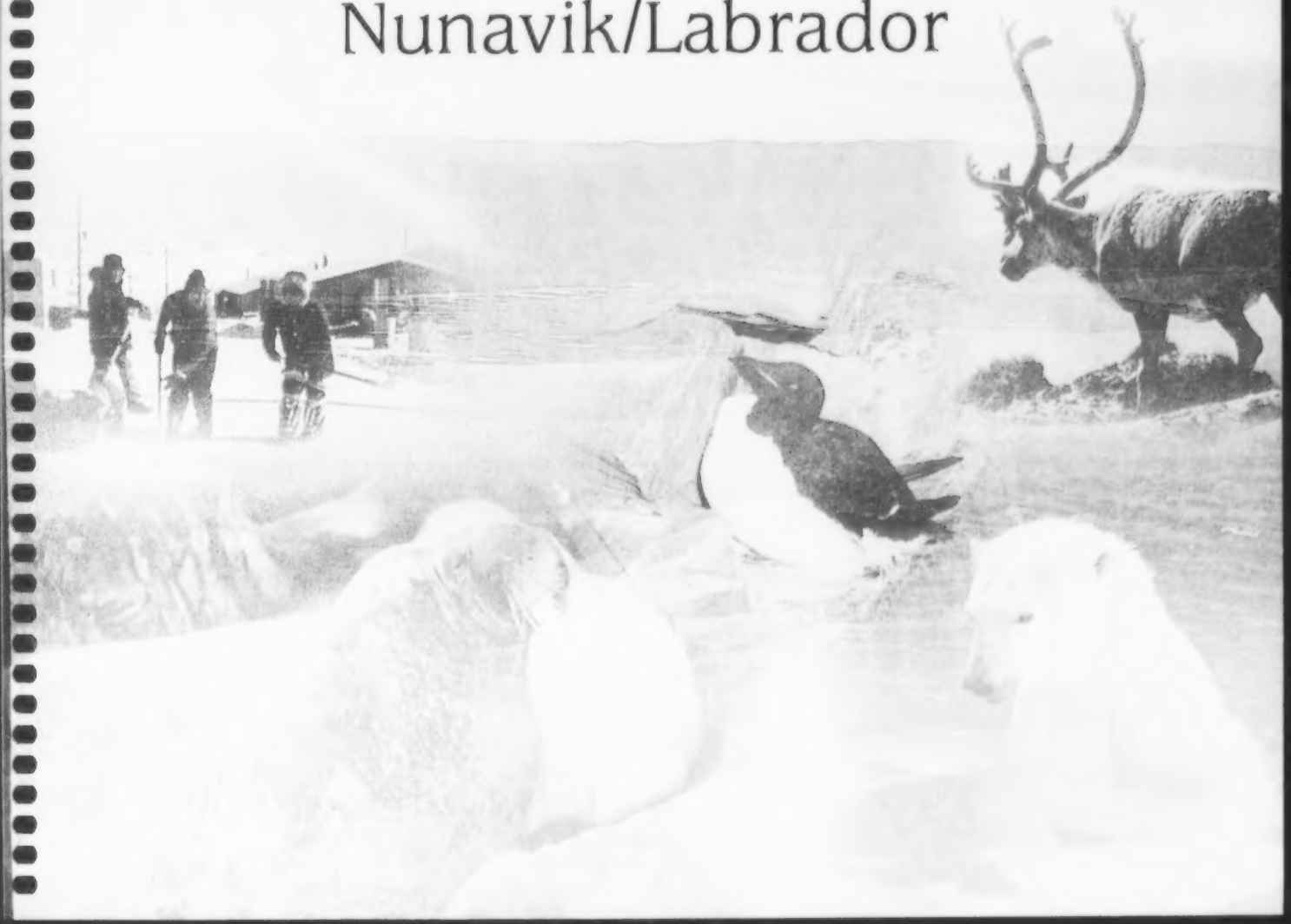
Phone: (204) 983-7113 (L. Lockhart)
(204) 984-6761 (G. Stern)
Fax: (204) 984-2403
E-Mail: LockhartL@dfo-mpo.gc.ca
SternG@dfo-mpo.gc.ca

Roger McNeely and Peter Outridge
Geological Survey of Canada
Natural Resources Canada
601 Booth St., Ottawa, ON
K1A 0E8

Phone: (613) 995-4241
Fax: (613) 992-0190
E-Mail: mcneeley@nrcan.gc.ca
outridge@nrcan.gc.ca

TIME FRAME:
April 1999 – March 2000. A report on the levels of mercury, lead and other contaminants will be assembled and stored on a computer. The data will be stored for use in future geographic analysis and will be published in a scientific journal. Results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop and included in the annual Synopsis of Research Report.

Nunavik/Labrador



Exposure of Preschool Aged Children to PCBs and Methylmercury

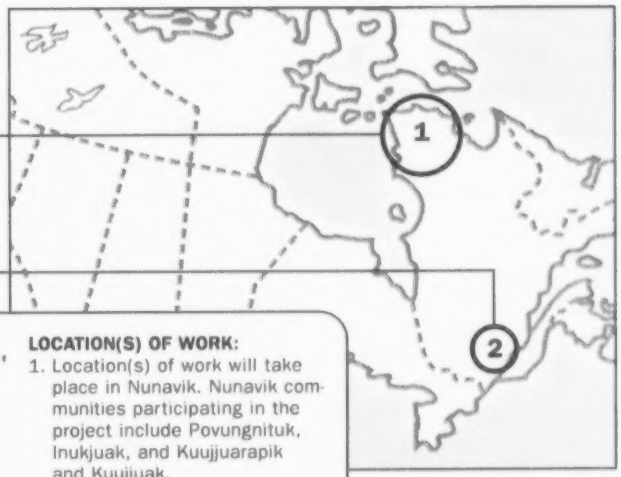
Q Are there effects on preschool aged children who were exposed to PCBs and mercury?

RELEVANCE:

The effects of prenatal exposure to PCBs and **methylmercury** resulting from marine **mammal** and fish consumption have been studied in fish eating populations in various countries. Prenatal exposure to PCBs has been linked to adverse developmental effects during infancy. However, only two studies provided data for school aged children, and some effects have never been studied. This study will help us find out if children exposed to **contaminants** (i.e. PCBs and methylmercury) in the womb, or through mother's milk, are showing any effects as they develop to the preschool age.

PROJECT SUMMARY:

This project will examine the developmental consequences on preschool aged children from prenatal exposure to PCBs and methylmercury. Project team members will examine 100 Nunavik Inuit children aged 4.5 years. Two groups of 50 children will be formed according to PCB exposure (low and high). The groups will have comparable socioeconomic status. A neurological exam will be performed, and fine motor, visual, cognitive and attentional functions will be assessed. The large number of children studied provides a unique opportunity to obtain more detailed information regarding the long term consequences of PCB and methylmercury exposure.



LOCATION(S) OF WORK:

1. Location(s) of work will take place in Nunavik. Nunavik communities participating in the project include Povungnituk, Inukjuak, and Kuujjuarapik and Kuujjuak.
2. Québec Toxicology Center (laboratory), Laval University.

SCHEDULE:

1 & 2. The project will be taking place throughout the year. To find out exactly when and where the project will be occurring, please contact project leader directly.

CONTACT INFORMATION:

Project Leader: Gina Muckle
Québec University Hospital Centre (CHUQ)
Québec Public Health Service
2400 d'Estimauville
Beauport, PQ
G1E 7G9

Phone: (418) 666-7000 ext. 360
Fax: (418) 666-2776
E-Mail: gmuckle@cspq.qc.ca

TIME FRAME:

November 1995 – March 2002. Initial results of the project will be available in 2002. Updates of the research procedures and progress of the project will be communicated to communities through posters. Up to date reports will be presented to the **Northern Contaminants Program (NCP)** and to Nunavik Nutrition and Health Committee each year.

Mercury Levels in People from Salluit – Changes Over Time and Interactions with Selenium

Q Have there been any changes in the levels of **mercury** in people from Salluit over the last 20 years?

Does **selenium** protect against the effects of mercury?

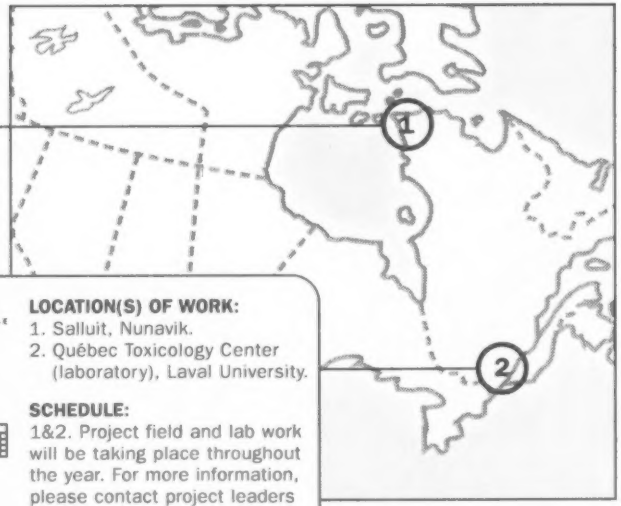
RELEVANCE:

There is some evidence that selenium, which, along with mercury, is found in marine **mammals**, may protect against the **toxic** effects of mercury. However, this relationship is not well understood. If both mercury and selenium are found in a food that people eat, it is important to know if the selenium has a protective effect that reduces the risk from mercury in that food.

In 1978, mercury levels, thought to be related to food consumption, were measured in people who live in Salluit, Nunavik. This study will tell us if there has been any change over the last 20 years in these people's exposure to mercury, and if the changes are related to changes in eating habits or in mercury levels in food. This study will help us understand if there is a relationship between selenium and protection against the toxic effects of mercury.

PROJECT SUMMARY:

This project will reassess the exposure to **methylmercury** in Inuit people from Salluit. Levels of selenium in this population will also be assessed. Measurements, derived from hair, blood, and urine will be taken to determine any effects induced by methylmercury. Results from this project will be useful to assess the health risks associated with methylmercury exposure in the Salluit population and to better understand the role of selenium in protecting against the **toxicity** of mercury.



LOCATION(S) OF WORK:
1. Salluit, Nunavik.
2. Québec Toxicology Center (laboratory), Laval University.

SCHEDULE:
1&2. Project field and lab work will be taking place throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Éric Dewailly and Suzanne Bruneau
Québec University Hospital Centre (CHUQ)
Québec Public Health Service
2400 d'Estimauville, Beauport, PQ, G1E 7G9

Phone: (418) 666-7000 (Éric Dewailly: ext. 222)
(Suzanne Bruneau: ext.202)
Fax: (418) 666-2776
E-Mail: edewailly@cspq.qc.ca
sbruneau@cspq.qc.ca

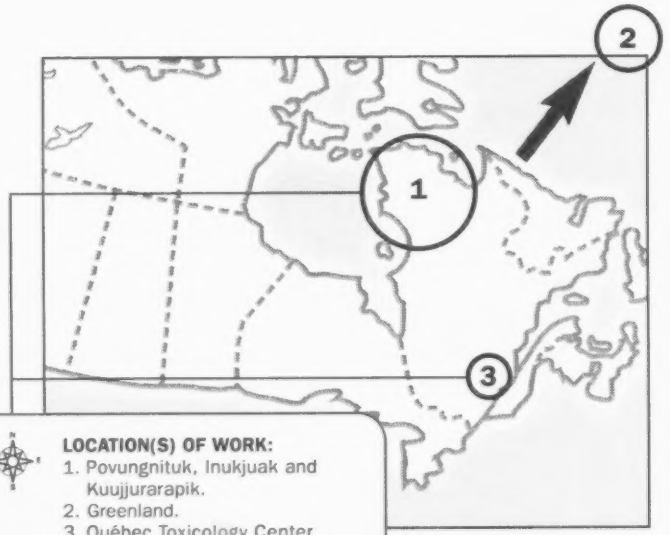
TIME FRAME:
April 1999 – March 2000. A scientific report will be written and educational tools will be developed by fall 1999. The Salluit population as well as the Nunavik Nutrition and Health Committee members, will be informed of project findings on current Salluit population exposure. Up to date reports will be presented to the **Northern Contaminants Program (NCP)** and to Nunavik Nutrition and Health Committee each year.

PCBs and Infant Development

Q Are there effects on infants who are exposed to PCBs before they are born, and if so, what are they?

RELEVANCE:
Inuit are exposed to PCBs through the consumption of fish and marine **mammals**. Studies have linked prenatal exposure to PCBs to delayed gross motor development, and deficiencies in physical growth and learning development. These findings have been supported through laboratory animal experiments and studies of more highly exposed children. Therefore, it is important to identify and assess the possible adverse effects that PCBs may have on infant development. This study will help us find out if children exposed to **contaminants** (specifically PCBs and **methlymercury**) in the womb, or through mother's milk, are showing any adverse effects.

PROJECT SUMMARY:
Mothers who are willing to participate in the study will be asked to allow scientists to assess their baby's overall health, monitor how their baby grows, and measure their baby's development and reactions during its first year of life. Three hundred Inuit infants from Nunavik and Greenland will be assessed at birth, 6.5 and 11 months of age. Scientists will assess whether there is a relationship between the assessments of the babies' health and development and the levels of PCBs, **pesticides** and **heavy metals** measured in the umbilical cord when the baby is born. Other factors that could contribute to the baby's health and development, such as the mother's diet and lifestyle, will also be considered. This research will also provide the opportunity to analyze human exposure to environmental contaminants such as PCBs and **mercury** over time.



LOCATION(S) OF WORK:
1. Povungnituk, Inukjuak and Kuujjurarapik.
2. Greenland.
3. Québec Toxicology Center (laboratory), Laval University.

SCHEDULE:
1, 2 & 3. The project will be taking place throughout the year. To find out exactly when and where the project will be occurring, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Gina Muckle
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This project is supported by: the Nunavik Nutrition and Health Committee: Minnie Grey, chairperson; the Corporation of the Northern villages of Inukjuak, Povungnituk, Salluit, Kuujjuarapik, and Kuujjuaq by their respective Mayor's, Municipal council's, Health Committee's and Women's Group's; the Pauktuutit Inuit Women's Association: Roda Grey, National Health Coordinator; Nunalitiqait Ikaluqatigiitut Inuit Association: Eva Deer, President, Board of Directors and Community Representatives; Ungava Tulattavik Health Center; Inuulitsivik Health Center, and; the Nunavik Regional Board of Health and Social Services.

TIME FRAME:
November 1995 – March 2002. Updates of the research procedures and progress of the project will be communicated to communities through posters. Up to date reports will be presented to the **Northern Contaminants Program (NCP)** and to Nunavik Nutrition and Health Committee each year.

The Effects of Prenatal Exposure of Organochlorines (OCs) and Mercury on the Immune System of Inuit Infants

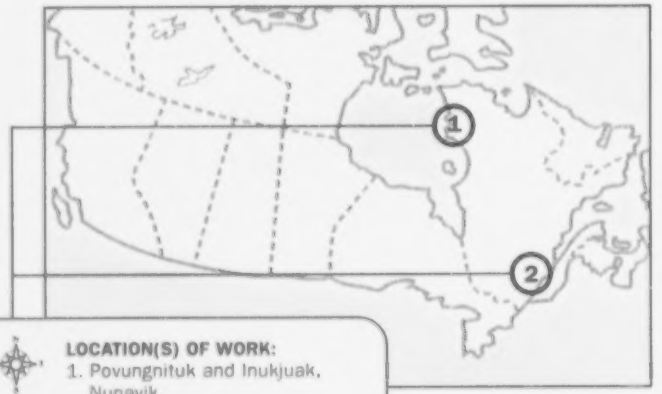
Q Is there a relationship between infants' ability to resist infection/disease and their exposure to **organochlorines (OCs)** and **mercury** before they are born?

RELEVANCE:

Environmental **contaminants** such as OCs can accumulate in the bodies of Inuit women due largely to their consumption of marine **mammal** fat. These contaminants can be transferred to the fetus during pregnancy and to the infant during breast feeding. Exposure to these contaminants before and after birth may reduce the ability of infants to resist diseases by affecting their **immune system**. It is not known if the current levels of contaminants in the north are causing these kinds of effects on people.

PROJECT SUMMARY:

This project will examine the effects of prenatal and postnatal (from birth to twelve months of age) exposure to OCs and mercury on the immune system. Approximately one hundred and fifty Inuit mothers and their newborns from Nunavik will be involved over the entire study period: ten in 1998/1999, seventy in 1999/2000 and seventy in 2000/2001. This study will provide more information about whether there are any effects on the immune system of Inuit infants, and if so, whether there is a relationship with exposure to contaminants before and after birth.



LOCATION(S) OF WORK:
1. Povungnituk and Inukjuak, Nunavik.
2. Québec Toxicology Center, Laval University.

SCHEDULE:
1 & 2. The project will be taking place throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Éric Dewailly
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TIME FRAME:
April 1999 – March 2002. Up to date reports will be presented to the **Northern Contaminants Program (NCP)** and to Nunavik Nutrition and Health Committee each year. Final results will be made available upon completion of the project in March 2002.

Decision-Making and Inuit Traditional Foods: Balancing the Physical, Economic and Social Components

Q What are the risks and benefits associated with traditional food consumption?

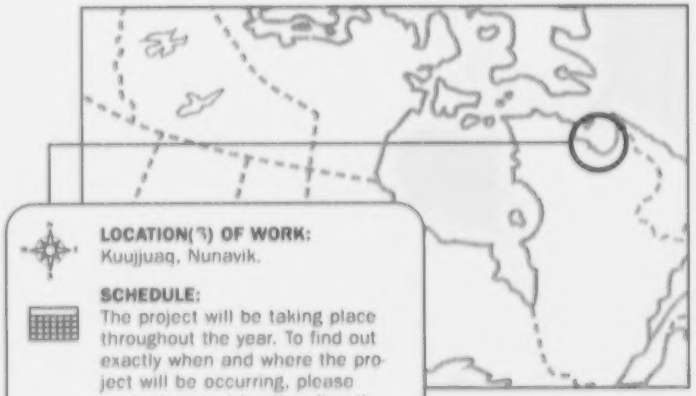
RELEVANCE:

The understanding of the risks and benefits of Inuit traditional diets has increased significantly within the last decade. Physical health benefits attributed in part to a traditional diet include: low incidence of heart disease, diabetes and some types of **cancer**, and a diet rich in unsaturated fatty acids and a variety of essential nutrients. At the same time, the understanding of potential public health risks related to the presence of environmental contamination in northern fish and wildlife has also increased. Traditional knowledge has long recognized the many benefits of these foods in terms of physical, social and spiritual well-being. A loss or disruption in this social and cultural component may occur through confusion and concern over food safety related to reports of environmental contamination. Because of this, it is important to study the social and cultural components related to traditional foods, such as factors influencing individual food choices. Information gathered can be used by health professionals and local communities to make informed decisions pertaining to nutritional health and well-being.

PROJECT SUMMARY:

This project will address the needs of northern health professionals in promoting healthy food choices by presenting benefits, risks and factors that influence northerners' food habits. Specifically, the project will review socio-cultural benefits and risks associated with a traditional diet and related activities, and organize this information in a conceptual framework, and develop a survey tool to increase understanding of diet behaviour.

The survey tool will help to understand the changes in consumption of traditional food, and the impacts of the communication of the results of contaminants research. The framework and survey tool will be applicable to other northern regions and groups to support health protection and promotion activities. This work will support Inuit health organizations and advisory bodies in providing information to Inuit and other northerners on traditional foods, nutrition and health.



LOCATION(S) OF WORK:
Kuujjuaq, Nunavik.

SCHEDULE:
The project will be taking place throughout the year. To find out exactly when and where the project will be occurring, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Éric Dewailly,
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TIME FRAME:
April 1999 – March 2001. Up to date reports will be presented to the **Northern Contaminants Program (NCP)** and to Nunavik Nutrition and Health Committee each year.

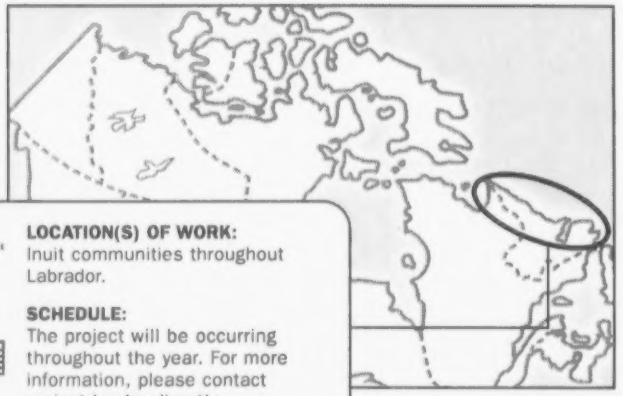
RELATED PROJECTS:
Related projects include "Nutrient Benefits of Traditional Food Consumed by Inuit", page 86 in booklet.

Traditional Food, Nutrition and Health Communications in Labrador

Q How can information regarding traditional foods, health and nutrition be communicated in an understandable way to Labrador Inuit communities?

RELEVANCE:
A great deal of data exists regarding the benefits and risks of an Inuit traditional diet in Labrador. Much of it has a direct impact on daily decision making on traditional food consumption made by individuals. However, this information is often presented in a highly technical and scientific form. The daily needs of northern individuals in decisions on traditional food consumption are such that this information needs to be summarized, condensed and put into an accessible format and language.

PROJECT SUMMARY:
This project will review and summarize information on traditional foods and diet, health and nutritional issues, and **contaminants** in the environment. A document will be produced that presents this information in a form and format accessible and understandable at the regional and community level. The document will be disseminated as a resource tool for Labrador Inuit communities, researchers, health and environment workers and decision makers.



LOCATION(S) OF WORK:
Inuit communities throughout Labrador.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Frank Andersen
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Fax: (709) 896-2610
E-Mail: franlia@cancom.net

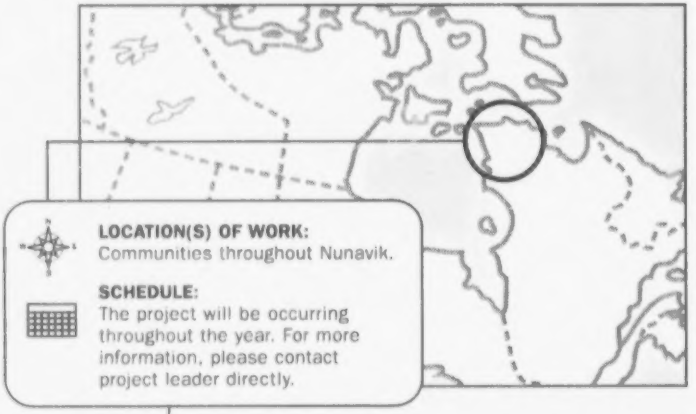
TIME FRAME:
April 1999 – March 2000.

Public Management of Environmental Health Information

Q How should information on nutrition, **contaminants** and health issues be communicated to the public?

RELEVANCE:
In Nunavik, the amount of information on nutrition, contaminants and health issues has increased significantly in recent years. Some of this information is not fully accessible. This has resulted in the need for members of the public and health professionals to have greater access to this information.

PROJECT SUMMARY:
The Nunavik Nutrition and Health Committee will integrate information produced by environmental, health and contaminants studies and make it available and understandable to the public, to local health workers and professionals. It will also help researchers to put their research results into a perspective understandable by the public. Communication of this information will be done through the preparation of documents written for public consumption, the development of a contaminants curriculum for Nunavik schools, and other means such as pamphlets, phone-in shows, public service announcements and local meetings.



LOCATION(S) OF WORK:
Communities throughout Nunavik.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Minnie Grey
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P.O. Box 149
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J0M 1C0

Phone: (819) 964-2905
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TIME FRAME:
April 1999 – March 2000. Apart from oral communications, written documents to be developed include pamphlets, research data summaries, adapted curriculum materials and sub-project reports. All documents will be made readily available.

Contaminants in Fish and Marine Mammals of Coastal Labrador and Nunavik

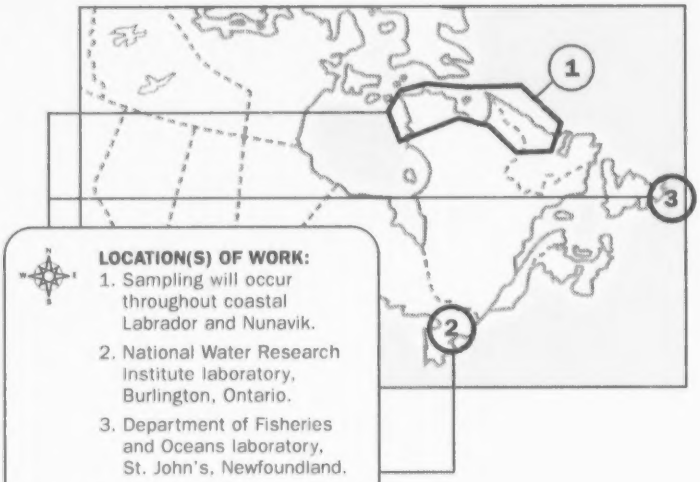
Q What are the levels of **persistent organic pollutants (POPs)** and **heavy metals** in fish, shellfish, mussels and marine **mammals** of coastal Labrador and Nunavik?

RELEVANCE:

People who live in the North are exposed to **contaminants** in fish and wildlife that are part of a traditional diet. In particular, people who rely on marine mammals may be exposed to higher levels of contaminants because the marine mammal **food chain** is longer and results in more **biomagnification**. The Northern Québec/Labrador Contaminants Workshop brought together community representatives from Nunavik and Labrador and scientists to set priorities for future work on contaminants in traditional foods. A priority initiative from this workshop was to determine trends of POPs and heavy metals in fish, shellfish and marine mammals that are important to Inuit communities of coastal Labrador and Nunavik. The information will be used in human **health risk assessment** and to develop baseline data for Labrador to allow comparison with other Canadian Arctic regions where there is significant human dietary exposure to contaminants in marine biota.

PROJECT SUMMARY:

This project will continue to sample the tissues of animals that are used for food by Inuit communities in Labrador and Nunavik. Tissues from bearded seal, scallops and shrimp will be sampled this year. Along with samples of tissues collected by Inuit hunters and fishermen, information will also be obtained on age, sex, and size of the animals for interpretation of the contaminants results. Contaminant information for these three species is limited or not available. As well, samples of seal tissues collected in 1998 will be analyzed for organochlorines.



LOCATION(S) OF WORK:

1. Sampling will occur throughout coastal Labrador and Nunavik.
2. National Water Research Institute laboratory, Burlington, Ontario.
3. Department of Fisheries and Oceans laboratory, St. John's, Newfoundland.

SCHEDULE:

1 – 3. The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Derek Muir
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E-Mail: derek.muir@cciw.ca

Local Contacts: Michael Kwan
Nunavik Research Centre
Kuujjuaq, PQ

Phone: (819) 964-2951

Joanna Lampe
Labrador Inuit Association
Nain, NF

Phone: (709) 922-2864

TIME FRAME:

1997 – 2003. Reports on contaminants levels will be made available to community representatives and to Health Canada. A preliminary report will be available to the Labrador Inuit Association and Nunavik Nutrition and Health Committee. A pamphlet explaining the study and its results will be produced by Nunavik Research Centre. The results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

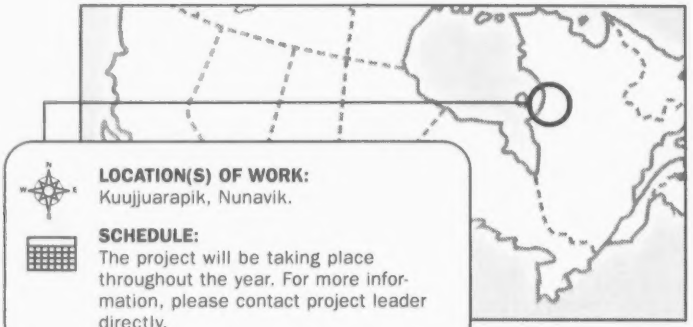
Mercury Transport in the Atmosphere: Identifying the Potential Routes of Contamination

Q How is atmospheric mercury transferred from the air to the Northern environment?

RELEVANCE:
Mercury is one of the most toxic **contaminants** in the environment. The long-range transport of atmospheric mercury from outside sources might be an important potential source of contamination to northern Québec (Nunavik). However, the extent of atmospheric transport and deposition of mercury has not been assessed and measured. It is important to identify how contaminants, such as mercury, are transferred from the air to the Northern environment, where these contaminants are deposited and in what amounts to lessen their potential impacts.

This information will assist in the development of international controls and regulations for mercury, and allow for a better understanding of mercury contributions from different sources to the atmospheric mercury concentrations in Nunavik.

PROJECT SUMMARY:
This project will study the long range transport of mercury and its deposition in the Arctic environment. Specifically, it will investigate natural Arctic phenomena that favour the release of some chemical compounds (such as **bromine** and **chlorine**) from seawater which may react with atmospheric mercury and increase its amount of deposition. The importance, magnitude and geographic extension of these phenomena throughout the northern region will be compared with other reference sites by comparing mercury chemistry and deposition. Finally, the project will study if there is any connection between atmospheric mercury deposition and mercury in the **food chain**.



LOCATION(S) OF WORK:
Kuujjuarapik, Nunavik.

SCHEDULE:
The project will be taking place throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Laurier Poissant
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E-Mail: laurier.poissant@ec.gc.ca

TIME FRAME:
April 1999 – March 2000.

RELATED PROJECTS:
Related projects include "Atmospheric Mercury Measurements at Alert, Nunavut", page 56 in booklet.

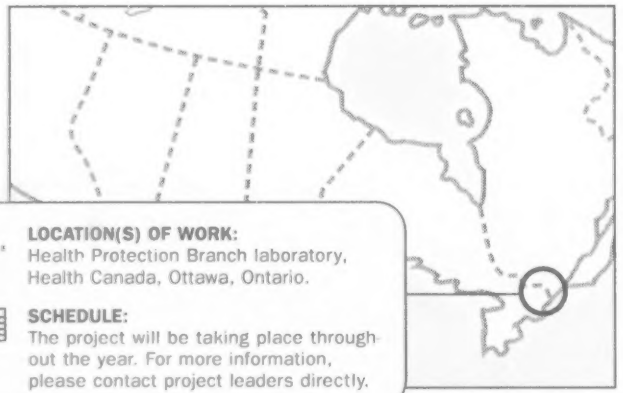
Other Locations

Risk Assessment for Dioxin-Like PCBs

Q What are the risks of dioxin-like PCBs found in Arctic wildlife?

RELEVANCE:
Dioxin-like PCBs belong to a group of man-made persistent **contaminants** which can be found in Arctic ecosystems. Detailed knowledge of the sources and pathways that lead to dioxin-like PCBs in the food chain is needed. Marine **mammals** have higher levels of PCBs compared to land mammals. Therefore, people who consume traditional country foods such as seal, beluga, walrus and narwhal can be exposed to elevated amounts of contaminants. It is important to determine the sources, pathways, and potential risks of dioxin-like PCBs entering the **food chain** in order to minimize **toxic** impacts on Arctic wildlife and peoples.

PROJECT SUMMARY:
The potential toxic effects of dioxin-like PCBs found in marine mammal blubber will be investigated in laboratory experiments using rats and mice. Information obtained from these experiments will potentially benefit health agencies who provide risk assessment advice to the public, and northern populations who may be at risk from dioxin-like PCBs due to consumption of traditional country food.



LOCATION(S) OF WORK:
Health Protection Branch laboratory, Health Canada, Ottawa, Ontario.

SCHEDULE:
The project will be taking place throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Mark Feeley
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TIME FRAME:
April 1999 – March 2000. Data will be reviewed, summarized and presented to the **Northern Contaminants Program (NCP)** at the Annual Results Workshop. Following this, manuscripts will be produced for publication in peer-reviewed journals.

A Model for Assessing the Risk from Mixtures of Organochlorines in Traditional Food (Phase III)

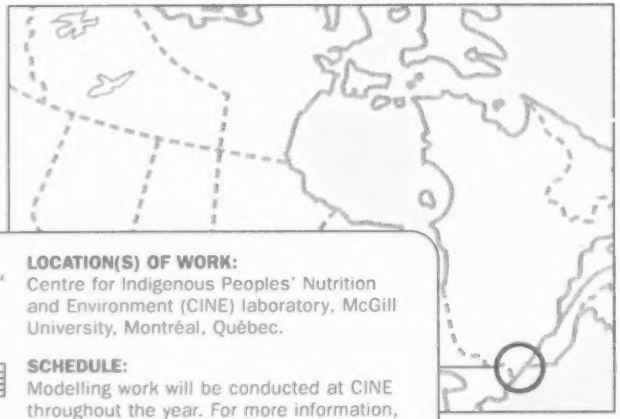
Q What are the potential health risks of the mixture of **contaminants** commonly found in the Inuit diet?

RELEVANCE:

Marine **mammals** and some fish, which are consumed as part of a northern traditional diet, contain significant amounts of **organochlorines (OCs)** (i.e. **toxaphene**, **PCBs**, **chlordane**). Little information exists on the risk to human health of mixtures of these contaminants. The results of this study will help reduce the uncertainty or unknowns that are associated with calculations of safe levels of OCs in human **health risk assessments**.

PROJECT SUMMARY:

This project will develop a framework for assessing the potential health risks to Arctic Inuit communities associated with the dietary intake of mixtures of contaminants in traditional food. A model will be developed to assess the acceptable human exposure dose (or **Tolerable Daily Intake**) of mixtures of organochlorine contaminants in traditional foods. An assessment of the potential health risks to Inuit populations exposed to the contaminant mixture in their diet will be made. The results of this study will help define the **toxicity** of chemical mixtures commonly found in the Inuit diet.



LOCATION(S) OF WORK:
Centre for Indigenous Peoples' Nutrition and Environment (CINE) laboratory, McGill University, Montréal, Québec.

SCHEDULE:
Modelling work will be conducted at CINE throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Laurie H.M. Chan
Centre for Indigenous Peoples' Nutrition and Environment (CINE)
McGill University
21, 111 Lakeshore, Ste. Anne de Bellevue, PQ
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TIME FRAME:
April 1997 – March 2000. Preliminary results will be presented at the **Northern Contaminants Program (NCP)** Results Workshop.

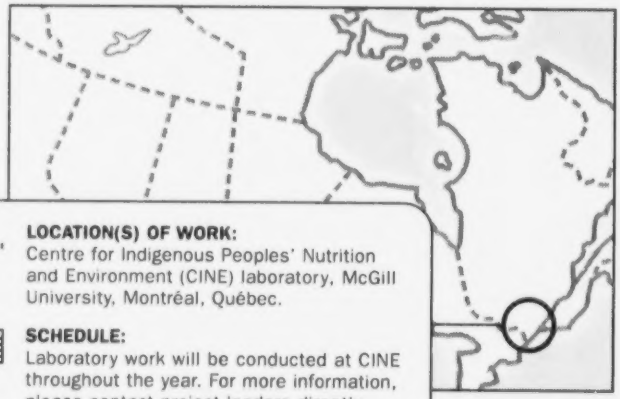
RELATED PROJECTS:
Related projects include "Assessment of Dietary Benefit: Risk in Inuit Communities", page 14 in booklet.

Dietary Effects on Methylmercury Toxicity in Rats

Q What are the effects of dietary factors on the toxicity of methylmercury?

RELEVANCE:
Elevated levels of **mercury** have been reported in the terrestrial, freshwater and marine biota in the Canadian North. Ringed seal, the most abundant marine **mammal** species in the Canadian Arctic, is a major component in the Inuit traditional diet. Elevated levels of mercury are commonly found in ringed seal meat. Because of this, it is important to identify the dietary factors which could influence methylmercury toxicity and to understand possible interaction between beneficial nutrients and **contaminants** in the diet.

PROJECT SUMMARY:
Researchers will study the effects of dietary factors on methylmercury toxicity using a series of feeding experiments with rats. In the experiments, rats will be fed different diets and then injected with methylmercury to see if seal oil or a diet of fish protein protects against methylmercury toxicity. Results of this study will help to better define the toxicity of the mercury in the Inuit diet.



LOCATION(S) OF WORK:
Centre for Indigenous Peoples' Nutrition and Environment (CINE) laboratory, McGill University, Montréal, Québec.

SCHEDULE:
Laboratory work will be conducted at CINE throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Laurie H.M. Chan and Stanley Kubow
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H9X 3V9

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kubow@agradm.lan.mcgill.ca

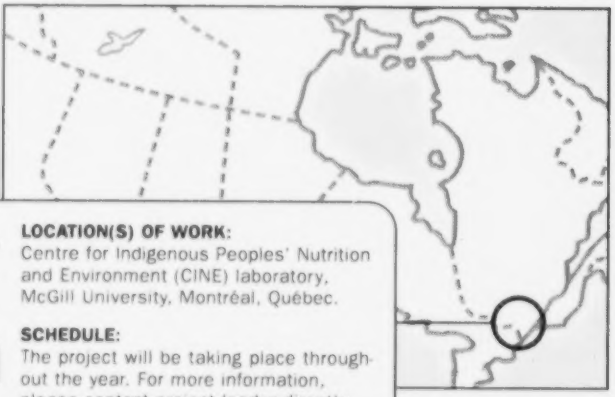
TIME FRAME:
April 1999 – March 2000. Upon completion of the project, information generated will be made available to answer some of the concerns on the safety of food and provide a stronger scientific basis in the development of environmental guidelines.

Toxicology of Mercury and Protection by Selenium in Ringed Seal Tissues (Phase II)

Q What are the effects of **mercury**, and does **selenium** provide some protection from these effects?

RELEVANCE:
Ringed seal, the most abundant marine **mammal** species in the Canadian Arctic, is a source of mercury in the Inuit traditional diet. There is some evidence that selenium, which is also found in marine mammals, may protect against the **toxic** effects of mercury. However, this relationship is not well understood. This study will improve our understanding of the risks from mercury in these foods that also contain selenium.

PROJECT SUMMARY:
This study is investigating the interaction between mercury and selenium in ringed seal tissues and the potential protection from **methylmercury toxicity** by selenium. Mercury and selenium in muscles, livers, brain and kidneys of ringed seals will be analyzed. Results will provide information on the **bioavailability** of mercury and the role of selenium in protection from mercury toxicity.



LOCATION(S) OF WORK:
Centre for Indigenous Peoples' Nutrition and Environment (CINE) laboratory, McGill University, Montréal, Québec.

SCHEDULE:
The project will be taking place throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leaders: Laurie H.M. Chan
Centre for Indigenous Peoples' Nutrition and Environment (CINE)
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21, 111 Lakeshore, Ste. Anne de Bellevue, PQ
H9X 3V9

Phone: (514) 398-7765
Fax: (514) 398-1020
E-Mail: chan@agradm.lan.mcgill.ca

TIME FRAME:
April 1998 – March 2000. Preliminary results will be presented at the **Northern Contaminants Program (NCP)** Results Workshop.

Nutrient Benefits of Traditional Food Consumed by Inuit

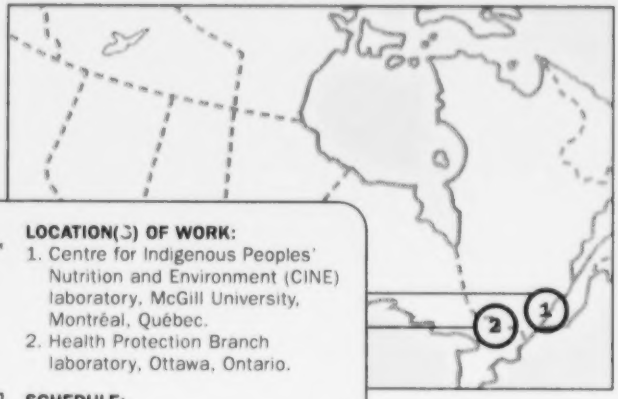
Q What are the nutritional benefits of consuming traditional foods?

RELEVANCE:

Arctic diets are composed of traditional and market foods. While most market foods have known values for human nutrition, there are many traditional foods for which nutrient levels are not known or are not completely known. Nutritionists working with Arctic peoples have frequently requested nutrient data to assist their work in dietary evaluation, in creating educational materials and in counseling. Therefore, it is important to measure the contribution of traditional food to overall nutrition. The results of this study will provide more understanding of specific vitamins in traditional food items reported to be consumed by Inuit, and will contribute to the full evaluation of risks and benefits of Inuit diets.

PROJECT SUMMARY:

The first round of dietary data and sample collection from five regions (Inuvialuit, Kitikmeot, Kivalik, Baffin and Labrador) is complete. Analysis of the data has identified the most frequently consumed traditional foods in these regions. Food samples were collected, weighed, frozen and transported to a laboratory. One hundred and fifty samples of these foods will be analyzed this year for vitamin content. Results from this analysis will be included in a dietary database.



LOCATION(S) OF WORK:
1. Centre for Indigenous Peoples' Nutrition and Environment (CINE) laboratory, McGill University, Montréal, Québec.
2. Health Protection Branch laboratory, Ottawa, Ontario.

SCHEDULE:
1 & 2. The project will be taking place throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: H.V. Kuhnlein and Laurie H.M. Chan
Centre for Indigenous Peoples' Nutrition and Environment (CINE)
McGill University
21, 111 Lakeshore, Ste. Anne de Bellevue, PQ
H9X 3V9

Phone: (514) 398-7544 (H.V. Kuhnlein)
(514) 398-7765 (Laurie H.M. Chan)
Fax: (514) 398-1020
E-Mail: kuhnlein@agradm.lan.mcgill.ca
chan@agradm.lan.mcgill.ca

TIME FRAME:
April 1997 – March 2000.

RELATED PROJECTS:
Related projects include "Decision-Making and Inuit Traditional Foods: Balancing the Physical, Economic and Social Components", page 48 in booklet.

Effects on Male Pig's Reproductive Function Following Organochlorine Exposure

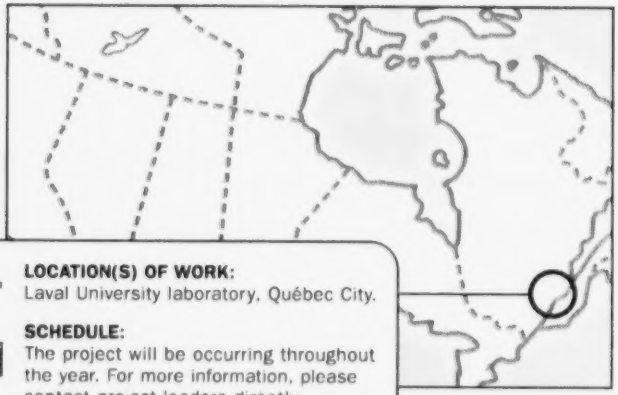
Q What are the effects of organochlorines (OCs) on male reproductive function?

RELEVANCE:

Certain male reproductive disorders have been linked to OCs such as **DDT**, a **pesticide** used in the 1950s and 1960s. However, the extent of these disorders is not entirely known. Therefore, it is important to identify and assess the possible detrimental effects that OCs may have on male reproduction. Pigs have been chosen in this experiment because of their ability to reach puberty at an early age and the similarity of their digestive, reproductive and other systems to that of humans. This **toxicology** study investigates the possible relationship between exposure to an OC mixture similar to that found in the Arctic aquatic **food chain** and adverse developmental effects on the male reproductive tract.

PROJECT SUMMARY:

This laboratory study will assess possible detrimental effects on male reproduction which may be induced by exposure to a mixture of OCs during pregnancy and early in life. OCs **bioaccumulate** in Inuit women in part due to their consumption of sea **mammal** fat. They can be transferred to the fetus during pregnancy and to the infant during breast feeding. Last year, female pigs were treated with an OC mixture similar to that found in species of the arctic aquatic food chain. Project team members will investigate the development of male piglet sexual organs during their first year of life.



LOCATION(S) OF WORK:
Laval University laboratory, Québec City.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Pierre Ayotte
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G1E 7G9

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Janice L. Bailey
Centre of Research in Biology of Reproduction (CRBR),
Laval University
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G1K 7P4

Phone: (418) 656-2131 ext. 3354
Fax: (418) 656-3766
E-Mail: janice.bailey@san.ulaval.ca

TIME FRAME:
April 1999 – March 2000. Results pertaining to the general developmental effects of organochlorine exposure and function of the male reproductive tract in pigs will be available in report form upon completion of the project. Up to date reports will be presented to the **Northern Contaminants Program (NCP)** and to Nunavik Nutrition and Health Committee each year.

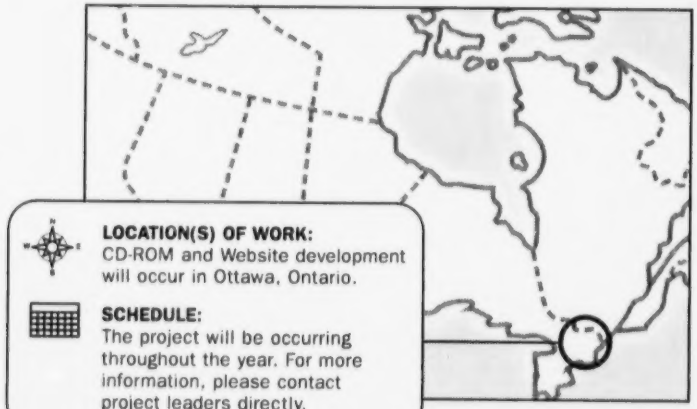
Information CD-ROM and Website on Contaminants in the Arctic

Q What new approaches can be used to better communicate research data and information about **contaminants** in the north?

RELEVANCE:
The contamination of traditional foods in the Canadian Arctic has become an increasingly important issue in many Inuit communities, in the last decade. Therefore, consumers of these foods must have access to information to be able to make informed decisions about the risks and benefits of harvesting and consuming these foods and the importance of preserving traditional lifestyles.

PROJECT SUMMARY:
This project will attempt a new approach, website and CD ROM, for communicating research data and information about contaminants in the north from the perspectives of scientists as well as the Inuit. This technology will provide general and specific information on contaminants issues to a wider and more diverse northern audience as well as specific audiences such as schools, regional and community organizations and scientists. The material will respect language differences wherever possible, and be available in several formats (written, visual, vocal, and printed).

Consultations will be conducted in the North to evaluate the needs, concerns and preferences of interested groups such as regional contaminants co-ordinators, educators and schools, health professionals and the general public. A major consideration will be to meet the requirements of the users in a fashion that is culturally appropriate and user friendly. The CD-ROM and Website will be tested with the anticipated audience. A user's manual will also be developed to guide people in the use this technology.



LOCATION(S) OF WORK:
CD-ROM and Website development will occur in Ottawa, Ontario.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Scott Nickels and Eric Loring
Inuit Tapirisat of Canada
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Ottawa, ON
K1P 5V5

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TIME FRAME:
April 1999 – March 2000.

The Centre For Indigenous Peoples' Nutrition And Environment (CINE) Response Strategy

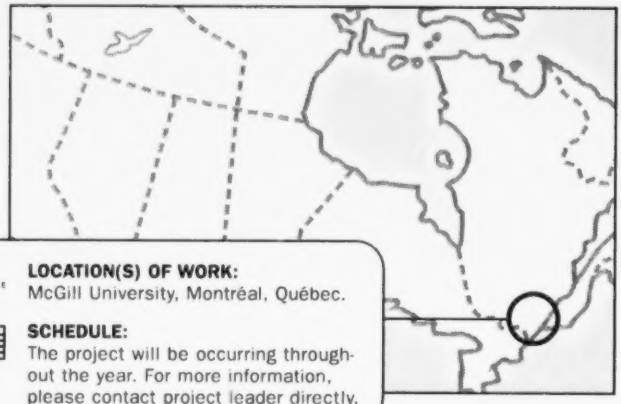
Q What does CINE do, and how is this work supported?

RELEVANCE:
CINE is located at McGill University and is involved in research and educational activities related to diet and ecosystems of Indigenous Peoples. Established in 1992, CINE has worked with a wide variety of communities of Indigenous Peoples to address their concerns about **contaminants**, the environment, traditional food systems, nutrition and health.

CINE has an all-Aboriginal Governing Board that includes representatives from the Assembly of First Nations, Council of Yukon First Nations, Dene Nation, Inuit Tapirisat of Canada, Inuit Circumpolar Conference, Metis Nation (NWT) and the Mohawk Council of Kuhnawake. The Board operates by consensus to fulfill its responsibilities which include: establishing research and community education priorities, reviewing and approving CINE activities, research proposals, publications and budgets, promoting CINE and pursuing funding for CINE, and providing input and assistance into public policy matters that may affect CINE.

In 1998, a strategic plan for CINE, developed through extensive consultation with all members, identified potential sources of funding needed for the future. This project addresses one item of this plan: response strategy.

PROJECT SUMMARY:
This project supports response strategy activities which include the basic administration of CINE, and other strategic initiatives from communities and governments. An Associate Director – Executive Manager will be recruited to manage CINE activities under the strategic plan.



LOCATION(S) OF WORK:
McGill University, Montréal, Québec.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: H.V. Kuhnlein
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TIME FRAME:
April 1999 – March 2000.

Co-ordination and Administration of the Northern Contaminants Program (NCP)

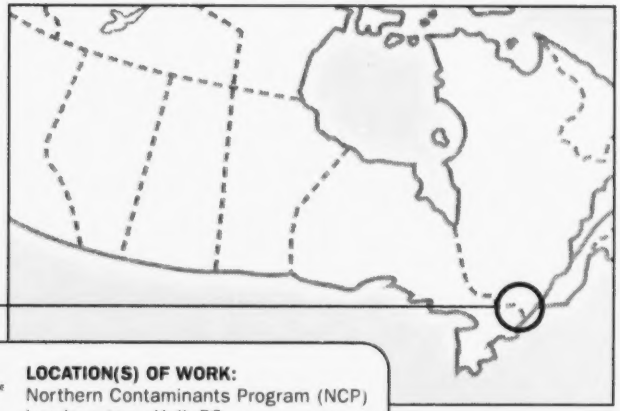
Q How is the Northern Contaminants Program (NCP) administered?

RELEVANCE:

Since 1991/1992, the Department of Indian and Northern Affairs (DIAND) headquarters has maintained the NCP secretariat function to co-ordinate the resources and activities of the program among four federal departments, territorial government departments, five Aboriginal organizations, and approximately a dozen universities and research institutes according to a co-management framework. DIAND has provided the NCP with financial administration and management services to support over 100 projects. DIAND also maintains the chairs for the NCP Management Committee (formerly the Science Manager's Committee) and some of the proposal Review Teams. These review teams facilitate the review of proposals under each of the program's components: human health, ecosystem and international monitoring, communications and education, and international policy. This management structure will ensure that the Program remains scientifically defensible, while at the same time, achieves real progress in terms of its broad policy objectives.

PROJECT SUMMARY:

DIAND headquarters will continue to manage the NCP. Management co-ordination of the Program will occur through financial and secretariat support and by organizing various program activities such as meetings and workshops in association with the territorial contaminants committees. DIAND will also co-ordinate and implement various communications activities in cooperation with Aboriginal organizations and territorial environmental contaminants committees. A website for the NCP will be developed and the annual reporting of project activities through the Results Workshop, the Synopsis of Research Report and the NCP Summary "Booklet" will continue.



LOCATION(S) OF WORK:
Northern Contaminants Program (NCP) headquarters, Hull, PQ.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: David Stone
Director
Northern Science and Contaminants Research
Department of Indian Affairs and
Northern Development (DIAND)
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Hull, PQ
K1A 0H4

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E-Mail: StoneD@inac.gc.ca

TIME FRAME:
April 1999 – March 2003.

Northern Contaminants Interlaboratory Quality Assurance Program

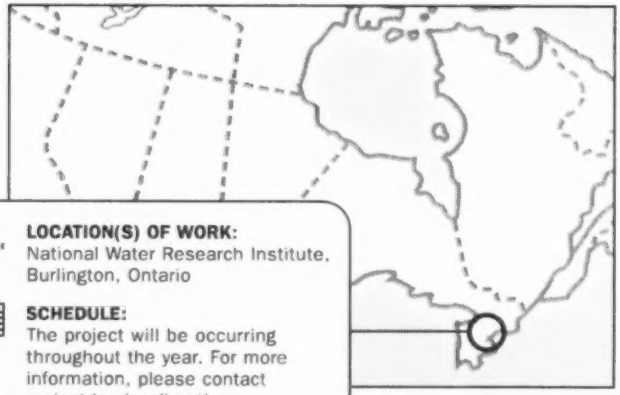
Q How can we make sure that all **Northern Contaminants Program (NCP)** laboratory data is accurate, reliable and comparable?

RELEVANCE:

Quality assurance (QA) and quality control (QC) are essential elements of all research and monitoring programs. Laboratory comparison studies provide assurance on the quality and reliability of data being generated and on the comparability of measurement results between laboratories. Without this assurance of data quality and comparability, the value of measurement information upon which decisions are made will be lost. It is imperative that managers have a scientifically sound base upon which to base their decisions.

PROJECT SUMMARY:

This project will provide information on the quality of data produced by Northern Contaminants Program (NCP) studies to assist managers and northerners to make informed decisions in the sources of **contaminants** and their effects on the Arctic environment and on human health. This information will ensure that international agreements and controls to protect the health of the Arctic ecosystem and northerners are based on scientifically sound data. Specifically, this project will ensure that contaminants data produced in laboratories are written with acceptable levels of precision and accuracy, and that there will be comparability of data among the different laboratories and between research projects.



LOCATION(S) OF WORK:
National Water Research Institute,
Burlington, Ontario

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Yvonne Stokker
National Water Research Institute
Environment Canada
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L7R 4A6

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TIME FRAME:
April 1999 – March 2000.

International Action to Control the Long-Range Transport of Contaminants to the Arctic

Q What international actions can be taken to control the transport of **contaminants** to the Arctic from outside sources?

RELEVANCE:
International action is required to stop the transport of contaminants to the Canadian Arctic and to reduce the accumulation of contaminants in northern **food chains**. This can be achieved by identifying where the contaminants are coming from and by reducing or eliminating their use at these sources.

PROJECT SUMMARY:
Canada will participate in a number of international activities that will help reduce the amount of contaminants that are transported to the north. These activities will assist in determining the significance of contaminant sources, in identifying contaminant transport pathways, and in developing appropriate international controls on emissions. These activities include:

1. Arctic Monitoring and Assessment Programme (AMAP). AMAP monitors man-made pollutants coming into the circumpolar Arctic environment and assesses their effects. Canada will develop national implementation plans for monitoring various contaminants.
2. United Nations Economic Commission for Europe (UN ECE) Convention. A legally binding protocol for **persistent organic pollutants (POPs)** has been agreed to under the UN ECE Convention. This protocol outlines controls and management options for POPs including bans and restricted use.
3. Action on POPs in Non – UN ECE Regions. Negotiations are underway to have a global legally binding agreement on POPs in place by 2000. Negotiation sessions have been held in Montréal (June 1998) and Nairobi (January 1999) with the next one scheduled for Geneva (September 1999). The main negotiation issues are capacity building in developing countries to make implementation of the agreement possible and establishing monitoring programs for POPs in the environment, human populations and food of developing countries.
4. Canada/Russia Scientific and Technical Co-operation in the Arctic. Canada is pursuing opportunities to gather information on the Russian Arctic in order to understand transport pathways of certain contaminants into the Arctic.

All of these activities have the purpose of reducing the transport of contaminants to the Arctic, which should, with time, result in a reduction of contaminant levels in northern food chains.

For more information, please contact project leader directly.

CONTACT INFORMATION:

Project Leader: David Stone, Director
Northern Science and Contaminants Research
Department of Indian Affairs and Northern Development
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K1A 0H4

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Support for the United Nations Environment Programme (UNEP) – Towards a Global Legally Binding Instrument on Persistent Organic Pollutants (POPs)

Q What is being done to make sure that the views and concerns of northern Aboriginal people play a role in international decisions about contaminants and their control?

RELEVANCE:

The future success of eliminating contaminants from northern **food chains** depends on a high level of concern and a strong will for action at all levels, including individual, community, national, and international. The **Northern Contaminants Program (NCP)** recognizes and supports such initiatives that link northern Aboriginal Peoples' concerns over contaminants in the north with global community negotiations. Over the last three years, the Canadian Arctic Indigenous Peoples Against POPs (CAIPAP) has participated in a number of activities to ensure that northern Aboriginal Peoples' concerns over contaminant issues have been brought to the attention of the global community.

PROJECT SUMMARY:

CAIPAP members include the Council of Yukon First Nations, Dene Nation, Inuit Circumpolar Conference (ICC), Inuit Tapirisat of Canada and the Métis Nation – NWT. The Committee is co-ordinated by ICC under the direction of the five member organization.

The Committee's objectives are:

- to raise international awareness of the concerns about contaminants of Canadian northern Aboriginal Peoples;
- to ensure Canadian northern Aboriginal People participate fully in domestic and international contaminant decision making; and
- to ensure the eventual international POPs agreement protects Canadian northern Aboriginal People.

The Committee ensures international recognition of the concerns of the northern Aboriginal organizations through the efforts of a technical advisor who is responsible for:

- providing timely and up-to-date information on national and international actions underway concerning POPs;
- preparing reports on major international negotiations;
- co-ordinating the position of northern Aboriginal Peoples for the UNEP Global POPs process;
- representing the Committee at international negotiations and regional meetings;
- providing technical and briefing material to the official northern Aboriginal representative on the federal delegation; and,
- building awareness in the north and south through media relations.

Through the efforts of the Committee, the concerns of Arctic residents about contaminants are being heard by the global community. Northern Aboriginal People are influencing the international process to eventually eliminate **persistent organic pollutants (POPs)** from the northern environment.

CONTACT INFORMATION:

Project Leaders: Terry Fenge
Inuit Circumpolar Conference
170 Laurier Ave., W., Suite 504,
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K1P 5V5

Phone: (613) 563-2642
Fax: (613) 565-3089
E-Mail: tuktu@magi.com

Project Co-ordinator: Stephanie Meakin
Inuit Circumpolar Conference
170 Laurier Ave. W., Suite 504,
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K1P 5V5

Phone: (613) 258-9471
Fax: (613) 258-7621
E-Mail: smeakin@netcom.ca

TIME FRAME:

April 1997 – March 2001. For more information, please contact project leaders directly.

Organochlorines and Mercury in Arctic Seabird Eggs

Q Have the levels of **organochlorines (OCs)** in Arctic seabirds increased, decreased or remained the same since the 1970s?

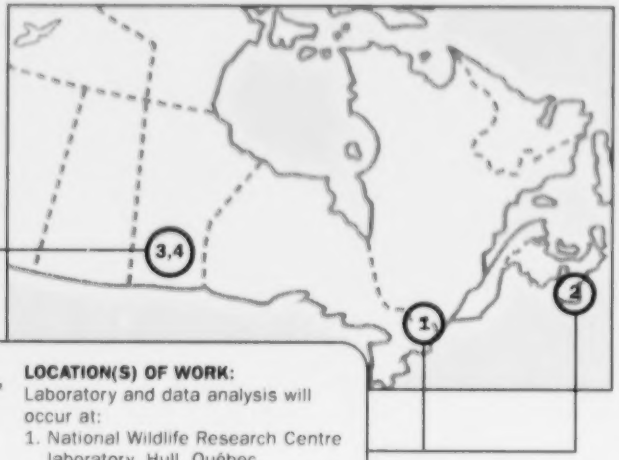
RELEVANCE:

The lack of information on changes in the levels of most **contaminants** over time is a significant knowledge gap at the present time. A seabird egg monitoring program was established to provide information on the contamination of the marine ecosystem and possible implications for seabird health. Scientists have measured the levels of OCs in Arctic seabird eggs from Prince Leopold Island since the mid-1970s. Before 1993, however, the procedures for chemical analyses were not the same from year to year. This makes it difficult to compare results over time.

PROJECT SUMMARY:

Archived Arctic seabird eggs will be re-analyzed for OCs to standardize the results for comparison over time and to confirm whether contaminant levels have been decreasing since the mid-1970s. A previous study using **archived** seabird eggs provided information on **mercury** trends over time. Additional analyses will be done to determine if changes over time are due to contaminant changes in the environment or to changes in diet of the birds. As well, eggs and livers of adult birds will be analyzed to identify any "new" OCs or heavy metals which may have entered the Canadian Arctic food chain.

Q



LOCATION(S) OF WORK:
Laboratory and data analysis will occur at:

1. National Wildlife Research Centre laboratory, Hull, Québec.
2. Philip Analytical Services Corporation laboratory, Halifax, Nova Scotia.

3 & 4. Canadian Wildlife Service laboratory and Department of Soil Science, University of Saskatchewan, Saskatoon, Saskatchewan.

SCHEDULE:
1 – 4. Laboratory analysis will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Birgit Braune
Canadian Wildlife Service
National Wildlife Research Centre
Environment Canada
100 Gamelin Blvd.
Hull, PQ
K1A 0H3

Phone: (819) 953-5969
Fax: (819) 953-6612
E-Mail: birgit.braune@ec.gc.ca

TIME FRAME:
April 1998 – March 2000. Results of the study will be communicated to northern communities upon completion of the project and presented at the Annual **Northern Contaminants program (NCP)** Results Workshop.

Role of Heavy Metal Contaminants in Seaduck Population Declines

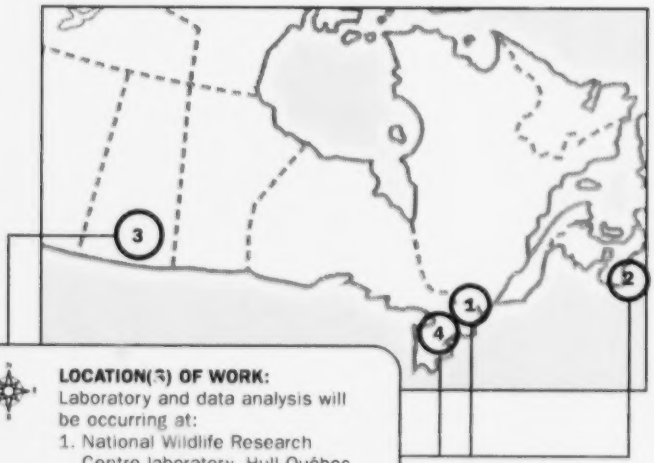
Q Is heavy metal contamination in Oldsquaw ducks leading to population declines?

RELEVANCE:

Populations of Oldsquaw are declining in western North America. This species breeds exclusively in the Arctic, and nests there in greater numbers than any other duck. Oldsquaw are harvested by Aboriginal people and sports hunters, however the numbers harvested by these two groups are unlikely the cause of this decline. Heavy metal contamination may be an important threat to Oldsquaw. Oldsquaw have been collected from across the Canadian Arctic during 1988-1994 and tissues from these birds have been **archived**. Analyses of heavy metal levels in the birds will help determine if they are more exposed to heavy metal contamination in the Arctic breeding grounds or in their overwintering grounds.

PROJECT SUMMARY:

In order to determine the role of **contaminants** in declining populations of Oldsquaw, archived tissue samples from Oldsquaw collected from their Canadian Arctic breeding grounds will be analyzed for **mercury**, **selenium** and copper (in liver), **cadmium** (in kidney) and **lead** (in bone). Some samples of liver will be analyzed for a wider range of metals. Samples of bone will also be analyzed to determine whether birds from certain geographical areas of the Arctic are overwintering in freshwater (i.e. the Great Lakes) or marine environments. Such information could be used to determine if birds overwintering on the Great Lakes risk greater exposure to contaminants than those overwintering in marine environments. Results will be communicated back to northern communities through the NWT Environmental Contaminants Committee.



LOCATION(S) OF WORK:
Laboratory and data analysis will be occurring at:

1. National Wildlife Research Centre laboratory, Hull Québec.
2. Philip Service Corporation laboratory, Halifax, Nova Scotia.
3. Department of Soil Science, University of Saskatchewan, Saskatoon, Saskatchewan.
4. Department of Earth Science, University of Waterloo, Ontario.

SCHEDULE:
1 - 4. Laboratory analysis will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Birgit Braune
Canadian Wildlife Service
National Wildlife Research Centre
Environment Canada
100 Gamelin Blvd.
Hull, PQ
K1A 0H3

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Fax: (819) 953-6612
E-Mail: birgit.braune@ec.gc.ca

TIME FRAME:
April 1999 – March 2001. Results will be reviewed and communicated back to northern communities upon completion of the project and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Levels and Effects of Contaminants in Arctic Seaducks", page 49 in booklet.

Inventory of Global Toxaphene Emission

Q Is there a link between global toxaphene usage trends and toxaphene concentration trends in the Canadian Arctic?

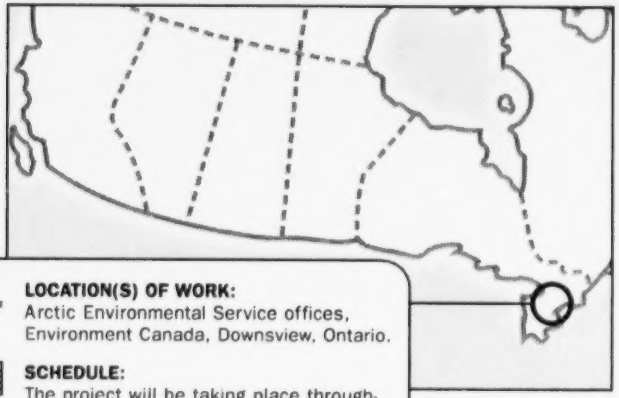
RELEVANCE:

Toxaphene is one of the most heavily used **pesticides** world wide and is considered by the World Health Organization (WHO) as a major hazard for some aquatic and terrestrial species. It has been measured in seawater from large areas of the Arctic Ocean and accumulates in some Arctic lake sediments. A global toxaphene usage/emission inventory is needed to study the link between global toxaphene usage trends and the toxaphene concentration trends in the Arctic.

PROJECT SUMMARY:

This project will study the usage and emission trends over time for priority pollutants in the Arctic and identify the relationships between these trends and the atmospheric concentration trends in the Arctic. In this year's work, the project team will continue to develop the Canadian Global Emissions Inventory with emphasis on toxaphene by completing the following tasks:

- creating a global usage inventory of toxaphene;
- generating a global toxaphene emissions database for 1970, 1980, and 1990; and,
- studying the relationship between the global toxaphene usage trends and toxaphene concentration trends in the Arctic environment.



LOCATION(S) OF WORK:
Arctic Environmental Service offices, Environment Canada, Downsview, Ontario.

SCHEDULE:
The project will be taking place throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Yi-Fan Li (lead), Terry Bidleman and Len Barrie
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Environment Canada
4905 Dufferin Street, Downsview, ON
M3H 5T4

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(416) 739-5730 (Terry Bidleman)
(416) 739-4868 (Len Barrie)
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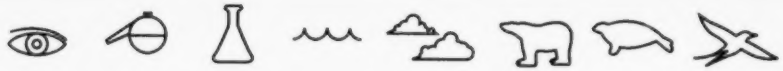
(416) 739-5708 (Terry Bidleman)
(416) 739-4224 (Len Barrie)
E-Mail: yi-fan.li@ec.gc.ca
terry.bidleman@ec.gc.ca
len.barrie@ec.gc.ca

TIME FRAME:
April 1999 – March 2003. It is planned that two papers on the project results will be published in peer-reviewed scientific journals during 1999, and it is further planned to present the results at the Annual **Northern Contaminants Program (NCP)** Results Workshop and at the Global Emission Inventories Activities (GEIA) workshop.

RELATED PROJECTS:
Related projects include "Modelling Contaminant Fate to Support International Negotiations", page 108 in booklet, and "Global Modelling of Persistent Pollutants", page 109 in booklet.



Sources, Fate and Bioaccumulation of Hexachlorocyclohexane (HCH)

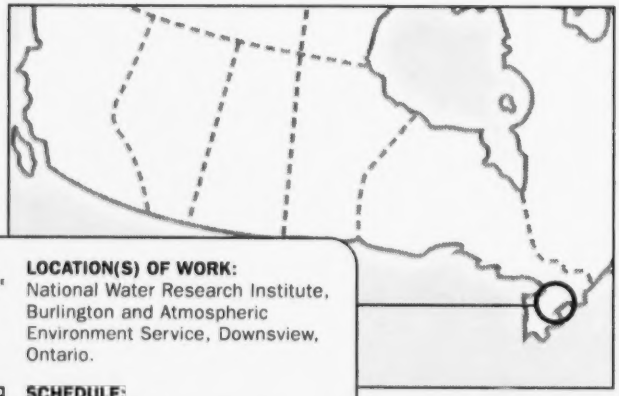
Q What are the sources and fate of **hexachlorocyclohexane (HCH)** compounds in the Arctic environment? How do these compounds **bioaccumulate**?

RELEVANCE:

HCHs are the most abundant **organochlorine (OC) pesticides** found in the Arctic Ocean. HCHs evaporate quickly in warm climates, disperse through the atmosphere and are deposited either from air to water or by rainfall. HCHs are released from air to water at lower temperatures resulting in higher concentrations in the Arctic Ocean. Elevated levels of this **contaminant** are found in animals and humans who are at the top of the Arctic **food chain**. Therefore, there is a need to investigate the sources, fate and **bioaccumulation** of HCH, from seawater and air to animals and humans.

PROJECT SUMMARY:

This project will determine if a specific HCH compound (beta-HCH) is more persistent than other HCH compounds (alpha-HCH and gamma-HCH) and how this compound **biomagnifies** in the Arctic marine food chain. It will also examine how beta-HCH is formed in the liver of marine mammals. An exposure assessment of the levels of beta-HCH in humans in the Canadian Arctic will be prepared. This project will involve reanalysis of existing samples of air, water and tissues from polar bears, seals and marine birds.



LOCATION(S) OF WORK:
National Water Research Institute, Burlington and Atmospheric Environment Service, Downsview, Ontario.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Derek Muir
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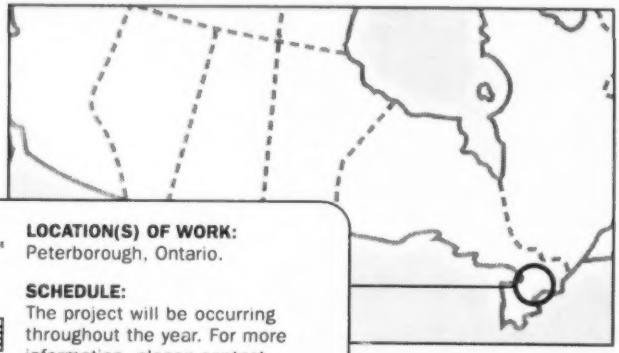
TIME FRAME:
April 1999 – March 2000. A presentation on the work will be made at the Annual **Northern Contaminants Program (NCP)** Results Workshop. Upon completion of the project in 2000, a final report will be made and published in a peer reviewed environmental science journal.

Modelling Contaminant Fate to Support International Negotiations

Q What is the fate of **contaminants** transported to the Arctic? How can this information be used to support international negotiations to reduce or eliminate these contaminants?

RELEVANCE:
Negotiations to reduce or eliminate the transport of persistent contaminants to the Arctic are occurring at the international level. Results from monitoring programs and modelling studies that demonstrate the transport of contaminants to the Arctic are needed to support these negotiations. These results should also show how the presence of contaminants in the Arctic ecosystem can result in human exposure. This will assist Canadian negotiators with needed information when dealing with the United Nations Environment Program (UNEP) and other international agencies to reduce or eliminate the use of certain chemicals.

PROJECT SUMMARY:
This project will undertake four tasks to support Canada's international negotiations on reducing or eliminating sources of **Persistent Organic Pollutants (POPs)** which may be transported to the Arctic. First, a model will be developed to demonstrate long-range transport, and that reduction in contaminants emissions leads to reduced contaminant concentrations and human exposure in the Arctic. Second, other models that determine long-range contaminant transport and persistence will be tested for adequacy in the Canadian Arctic where temperatures are much lower and ecosystems are quite different. Third, the project will look for "new" chemicals which may be of concern in the Arctic. Finally, easy to read articles on the sources and transport of POPs, and their fate in the Arctic will be produced.



LOCATION(S) OF WORK:
Peterborough, Ontario.

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

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TIME FRAME:
April 1999 – March 2000.

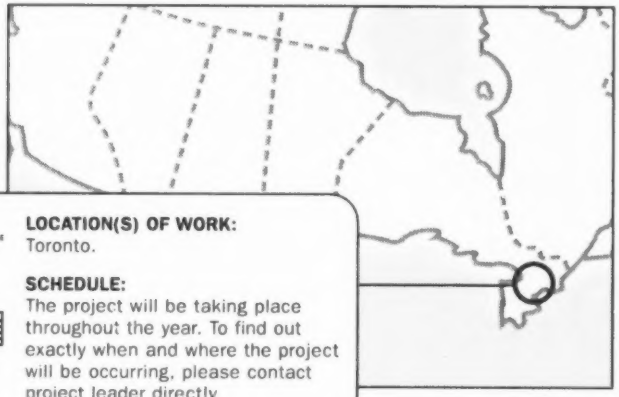
RELATED PROJECT(S):
Related projects include "Global Modelling of Persistent Pollutants", page 109 in booklet, and "Inventory of Global Toxaphene Emission", page 104 in booklet.

Global Modelling of Persistent Pollutants

Q How do **contaminants** move through the global environment? Why do contaminants accumulate in colder regions, such as the Arctic?

RELEVANCE:
Computer models are important tools for explaining how, why and over what time period contaminants can travel from source regions in the south and collect in the Arctic. This information has been, and continues to be, very important for proving to other countries the need for international controls of contaminants.

PROJECT SUMMARY:
Researchers will continue to develop existing computer models that describe how contaminants released into the atmosphere in a warm region are deposited in cooler regions like the Canadian Arctic where they can accumulate over time. This is known as the grasshopper effect. Further development of these models will improve the ability to identify source regions, and predict changes in contaminant levels in different environments as the amounts released from source regions change. This project will test how well the model describes the transport of selected contaminants from source regions to the Arctic, and how accurate model predictions are.



LOCATION(S) OF WORK:
Toronto.

SCHEDULE:
The project will be taking place throughout the year. To find out exactly when and where the project will be occurring, please contact project leader directly.

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TIME FRAME:
April 1998 - March 2001. Results of the project are expected to be published and a number of presentations are expected to be made. For more information, please contact project team members directly.

RELATED PROJECTS:
Related projects include "Modelling Contaminant Fate to Support International Negotiations", page 108 in booklet, and "Inventory of Global Toxaphene Emission", page 104 in booklet.

Appendices

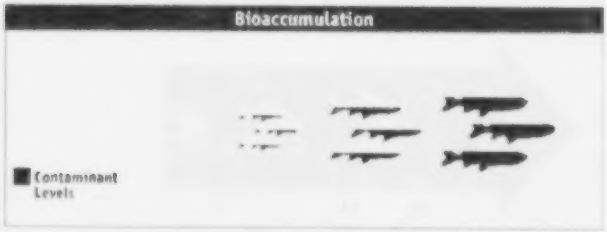
Glossary

ANTIBODIES
Antibodies are produced in blood in response to the intrusion of substances (like toxic contaminants) which aren't usually present in blood.

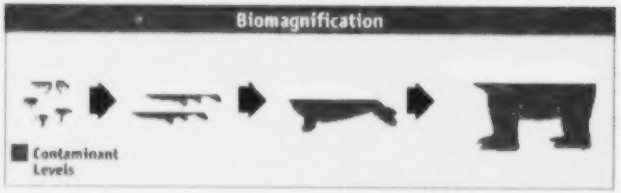
ARCHIVED
Archived samples refers to samples (e.g. animal tissues or organs) that are stored, usually frozen, for future use.

ARSENIC
Arsenic is a poisonous heavy metal with a fairly low toxicity in comparison with some other metals. Arsenic is present in foods that come from soil (such as plants), the oceans (such as clams) and meats. Arsenic accumulates in the body, particularly in the skin, hair, and nails, but also in internal organs. Luckily, absorption of arsenic is fairly low.

BIOACCUMULATION
Bioaccumulation is the build-up or storage of substances (such as contaminants) in the bodies of animals over time as the animals continue to eat food or drink water containing the contaminant. Contaminants that bioaccumulate are very slow to change or do not change to a form that can be digested and eliminated by the animal.



BIOMAGNIFICATION
When an animal eats a plant or another animal, it consumes all the contaminants stored in that food. Contaminants can biomagnify in animals that use other animals for food because the concentration increases with each step from prey to predator.



BIOAVAILABILITY
If a chemical is bioavailable, this means that it is in a form that can be taken up or absorbed by plants and animals.

BROMINE
Bromine is a dark liquid element with an irritating smell. Bromine is used in the manufacturing of chemicals for photography and medicine.

CADMIUM
Cadmium is a type of heavy metal found naturally in soils and rocks. It is soft and has a silvery colour. It is often found with another metal called zinc. It is mined and used in some industries to make things such as batteries, some pesticides, some types of paint, and certain parts of the equipment that makes nuclear power.

CANCER
Cancer is a disease that results in the disordered growth of the body's cells resulting in tumors (large masses of cells). It may be caused by exposure to certain substances, such as some kinds of contaminants.

CARCINOGEN
A carcinogen is a chemical or physical agent that tends to cause cancers or tumors.

CESIUM
Cesium is a human-made radioactive element produced by the breaking up of uranium atoms in a nuclear power plant or in atomic weapons. It remains dangerous for a long time because the period of time it takes to lose half it's radiation and change into safer substance is 30 years. Cesium is an airborne contaminant.

CHLORDANE
Chlordane is an organochlorine (OC) pesticide made by humans to kill insects. It was used a lot in the 1960s and 1970s to kill cockroaches in peoples' homes but it is not used very much any more.

CHLORINE
Chlorine is a naturally occurring, poisonous greenish-yellow gaseous element used for purifying water, bleaching and in the manufacturing of many organic chemicals.

CHLORINATED DIPHENYL ETHERS (CDPEs)
Chlorinated diphenyl ethers can be formed as by-products in the manufacturing process of chlorophenyls (i.g. PCBs) or in combustion processes.

CONTAMINANTS
A contaminant is a substance that is found in a place where it should not be. This does not necessarily mean that it is harmful, but depending on what it is and the amount that is present, it may be. The types of contaminants that are found in the Canadian north include:

- **Persistent Organic Pollutants (POPs)**, a group of mostly human-made chemicals which includes the substance called **organochlorines (OCs)** and can stay in the environment for many years without changing. They can be transported long distances in the atmosphere.
- **Heavy metals** such as mercury, cadmium, and lead; and
- **Radionuclides** such as polonium.

DDT
DDT is an organochlorine (OC) pesticide developed in the 1940s to kill lice and to kill biting insects that carry diseases such as: malaria, yellow fever, and typhus. DDT was heavily used as a pesticide to kill insects that fed on farmers' crops in the 1950s and 1960s in the Great Lakes region until it was found to be harmful to other forms of life. DDT is banned in Canada.

DIOXIN
Dioxin is a colourless toxic liquid used as a solvent (a dissolving or weakening agent).

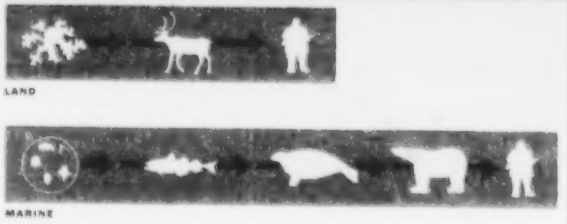
DIOXIN-LIKE PCBS
There are 209 different types of PCBs, and of these, 13 are similar to dioxin in toxicity.

ENDOCRINE
Endocrine refers to endocrine glands or their secretions. Endocrine glands are those that secret hormones directly into the bloodstream, including pituitary, thyroid, adrenal, testes and ovaries.

FOOD CHAIN

Plants and animals can be linked together in feeding relationships called food chains. At the bottom of food chains are green plants that convert sunlight into food energy for the rest of the chain. Animals that eat the plants are then eaten by another animal, and so on up the chain. The number of animals involved can vary. For example, in the north, the lichen ->caribou-> human food chain has fewer feeding links, and is much shorter than the algae (a small plant that lives in water but needs sunlight)-> fish->seal->polar bear->human food chain. In nature, food chains overlap to form food webs.

Food Chain Length Comparison (Marine vs Land Animals)



FOOD CONSUMPTION ADVISORIES

Food consumption advisories are sometimes issued by Health Canada when they determine that the level of contaminants in a traditional food may cause a risk to the health of those who eat this food. Such an advisory may recommend, for example, that people should only eat a certain number of livers from a particular fish species in a year.

HEALTH RISK ASSESSMENT

A health risk assessment is a study that calculates the amount of contaminant in a food and compares that to the amount of contaminant that we know is safe to eat over a lifetime.

HEAVY METALS

Heavy metals are naturally-occurring metals found in rocks and soils that do not break down into smaller elements. Heavy metals can also be released to the environment by human activities. They generally do not break down and therefore persist in the environment. Examples of heavy metals are mercury and cadmium.

HEXACHLOROCHYCLOHEXANE (HCH)

Hexachlorocyclohexane (HCH) is an organochlorine (OC) that is used to kill insects. They do not break down easily in the environment, and can be transported great distances in the atmosphere.

IMMUNE SYSTEM

The immune system is made up of cells and tissues responsible for recognizing and attacking foreign microbes and substances in the body.

LEAD

Lead is a soft, blue-grey, easily-worked and melted heavy metal that is naturally present in rocks and soils. It is used to make some kinds of glass, shot for shotguns, and combined with other metals for use in a variety of metallic items. Lead may be released to the environment by human activities, including the use of leaded gasoline (in North America, lead was added to gasoline until the 1980s). Lead can be toxic to living things. In animals and people, lead accumulates in the brain and bones.

MAMMAL

Mammals are warm-blooded animals with backbones. Females produce milk to nurse their young with. Mammals are usually covered in hair, but not always. Walrus, seal, whales, polar bears, caribou, muskoxen, muskrat, hare and humans are all mammals.

MERCURY
Mercury is a heavy metal that is naturally found in rocks and soil in combination with other chemicals. It is the only metal that is liquid at room temperature. It is silvery in colour and flows easily so it is sometimes used in thermometers. There are many human-made sources of mercury that are released to the atmosphere. Also, mercury may be released when soils are flooded in the creation of reservoirs for making electricity. Mercury is toxic to most living things. It accumulates in the liver, kidneys, hair, and skin of animals and people.

METHYLMERCURY
Mercury, like other metals, can be found in different chemical forms in the environment. Methyl mercury is the form of mercury that is most likely to cause effects. Methylmercury can also bioaccumulate and biomagnify in food webs. Methylmercury can accumulate in the brain.

NORTHERN CONTAMINANTS PROGRAM (NCP)
The Northern Contaminants Program (NCP), has been developed through consultation with the scientific community, northern aboriginal organizations, other governmental departments, and northern communities. Its ultimate goal is to reduce and wherever possible eliminate contaminants in country food. Supporting this goal are the NCP's priorities for providing people with the tools and information for making their own informed decisions, through education, communication, and community participation in the program.

ORGANOBROMINE
Organobromines are bromine-containing chemicals made by humans. Several organobromines are used as flame retardants in plastics.

ORGANOCHLORINES (OC)

Organochlorines are chlorine-containing chemicals made by humans. Organochlorines dissolve in fats and oils, and therefore are stored in the fat and blubber of animals (they bioaccumulate) and are passed on through the food chain (they biomagnify). Examples of OCs include: toxaphene, and chlordane. Organochlorines can be toxic or poisonous to living things.

PCBS
Polychlorinated biphenyls (PCBs) are a group of human made, industrial organochlorine (OC) chemicals. There are many different kinds of PCBs. Because they do not conduct electricity, PCBs were used in electrical transformers as insulators since the 1930s. They do not break down easily in the environment and there is concern that PCBs may be harmful to living things. Some kinds of PCBs are thought to cause cancer and may contribute to other subtle effects in unborn children. The use of PCBs was banned in many countries, including Canada, in the 1970s.

PERSISTENT ORGANIC POLLUTANTS (POPS)
POPs are a group of mostly human-made chemicals which includes the substances called organochlorines (OCs). POPs can be transported long distances in the atmosphere and can stay in the environment for many years without changing.

PESTICIDES
Pesticides are poisons used to kill pests (plants or animals that are a nuisance or harmful). There are two main types. Insecticides are used to kill insects while herbicides are used to kill weeds, mold, and fungus. Chlordane, toxaphene, and DDT are examples of pesticides.

POLLUTION/POLLUTANT
Pollution/pollutant are terms used for any human-made substance that can damage the environment (air, water, or on the land).

POLYBROMINATED BIPHENYLS (PBBs) AND BROMINATED DIPHENYL ETHERS (BDPEs)
Polybrominated byphenyls and brominated diphenyl ethers are a group of human-made organobromine chemicals that are used as flame retardants in various plastic materials, such as polystyrene.

RADIONUCLIDES
Radionuclides are small particles that emit radiation and like heavy metals, are naturally present in rocks and soils. They may also be human-made. Certain kinds of radionuclides have been released to the environment because of activities such as the atmospheric testing of nuclear weapons and nuclear waste dumping. Radionuclides tend to accumulate in the bones and muscles of animals and people. Natural radionuclides in the Canadian north include polonium and lead. An example of a radionuclide made by humans is cesium.

SELENIUM
Selenium is a nonmetallic element that resembles sulfur. It can be naturally found in rock and soils from some areas.

TESTOSTERONE
Testosterone is a male steroid sex hormone which forms in the testicles.

THYROID
A thyroid is a large gland found in the neck of mammals. This gland secretes a hormone which regulates growth and development rates.

TOLERABLE DAILY INTAKE (TDI)
Scientists can come up with an estimate of how much of a contaminant a person could receive every day of their life, from all sources, without any significant effects. This amount is known as the Tolerable Daily Intake (also sometimes called the Acceptable Daily Intake). It is reported as the amount of contaminant per kilogram body weight per day.

TOXAPHENE
Toxaphene is an organochlorine (OC) chemical that was used as a pesticide from the 1950s to 1970s. Toxaphene was found to be very poisonous to living things, especially fish. Toxaphene has never been licensed for use in Canada, and it was banned in the United States in 1982.

TOXIC (TOXICITY)
These are terms used to refer to a substance capable of causing harm or that is poisonous to humans, animals, or other living things. In common usage, the term toxic substances refers to chemical substances that are capable of causing harm at very low levels of exposure.

TOXICOLOGY
Toxicology refers to the scientific study of the effects, chemistry, and treatment of poisonous (toxic) substances.

AFFILIATIONS AND PROJECT LEADERS
The following list can be used to search for a project by affiliation or project leader.

Centre for Indigenous Peoples' Nutrition and Environment (CINE) and McGill University
Chan, Laurie: pages: 82, 84, 85, 86
Kubow, Stanley: page: 84
Kuhnlein, Harriet: pages: 14, 86, 91
Wenzel, George: page: 39

Council of Yukon First Nations (CYFN)
Dickson, Cindy: pages: 2, 4, 5, 6

Dene Nation:
Armstrong, Allison: page: 22

Department of Fisheries and Oceans (DFO)
Stern, Gary: pages: 28, 48, 54, 60
Lockhart, Lyle: pages: 28, 30, 32, 60
Low, George: pages: 28, 30, 32, 34

Department of Indian Affairs and Northern Development (DIAND)
Mills, Carole: pages: 26, 44, 46
Palmer, Mark: pages: 7, 8, 9, 10
Stone, David: pages: 92, 96

Environment Canada (EC)
Barrie, Len: pages: 58, 104
Biddleman, Terry: pages: 54, 104, 106
Braune, Birgit: pages: 100, 102
Evans, Marlene: pages: 30, 32, 34
Li, Yi-Fan: page: 104
Muir, Derek: pages: 34, 51, 54, 76, 106
Norstrom, Ross: page: 50
Schroeder, William: page: 56
Poissant, Laurier: page: 78
Stokker, Yvonne: page: 94
Wayland, Mark: page: 49

Geological Survey of Canada:
McNeely, Roger: page: 60
Outridge, Peter: page: 60

Government of the Northwest Territories (GNWT)
Elkin, Brett: pages: 36, 52

Gwich'in Tribal Council
Nerysoo, Richard: page: 24

Health Canada
Feely, Mark: page: 80
Iverson, Frank: page: 80
Ryan, Jake: page: 80

Inuit Circumpolar Conference (ICC)
Fenge, Terry: page: 98
Meakin, Stephanie: page: 98

Inuit Tapirisat of Canada (ITC)
Loring, Eric: pages: 40, 42, 44, 90
Nickels, Scott: pages: 40, 42, 44, 90

Inuvik Regional Health and Social Services Board
Tofflemire, Karen: page: 16
MacNeil, Chuck: page: 16

Labrador Inuit Association
Andersen, Frank: page: 74
Lampe, Joanna: page: 76

Laval University
Bailey, Janice: page: 88
Godin, Gaston: page: 72

Métis Nation
Farrow, Judy: page: 19, 20, 38

Nunavik Nutrition and Health Committee
Grey, Minnie: page: 75

Nunavik Research Centre
Kwan, Michael: page: 76

Nunavut Research Institute
Shirley, Jamal (James): page: 46

Nunavut Tunngavik Inc.
Forth, Terry: page: 40

Québec University Hospital Centre (CHUQ)
Ayotte, Pierre: page: 88
Bernier, Suzie: page: 72
Bruneau, Suzanne: page: 66
Dewailly, Éric: pages: 66, 70, 72
Furgal, Chris: page: 72
Muckle, Gina: pages: 64, 68

Sahtu Secretariat
Davidson, Brian: page: 25

Trent University
Mackay, Donald: page: 108

University of Montréal
Krishnan, Kannan: page: 82

Wildlife Management Advisory Council (NWT)
Usher, Peter: page: 18

WECC Wania Environmental Chemists Corp.
Wania, Frank: page: 109

Key Subject Areas and Contaminants

ARSENIC
pages: 28, 30, 34

CADMIUM
pages: 49, 102

CHLORDANE
page: 82

DDT
pages: 48, 88

DIOXIN
pages: 34

LEAD
pages: 60, 102

MERCURY (INCLUDING METHYLMERCURY)
pages: 16, 28, 30, 32, 34, 49, 56, 60, 64, 66, 68, 70, 78, 84, 85, 100, 102

PCBS
pages: 39, 48, 50, 64, 68, 80, 82

SELENIUM
pages: 28, 30, 34, 49, 66, 85, 102

TOXAPHENE
pages: 82, 104

TRADITIONAL FOOD
pages: 2, 5, 7, 10, 14, 16, 18, 24, 38, 44, 52, 72, 74, 76, 80, 82, 86, 90, 91

TRADITIONAL KNOWLEDGE
pages: 2, 4, 6, 8, 22, 36, 42, 72

For More Information

If you wish to obtain more information on any of the projects within this booklet or have any questions regarding contaminants in general, please feel free to contact any of the persons listed below, they will be glad to assist you.

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